# **Hammersmith Hospitals Trust**

**Guidelines for Management of Diabetes Mellitus** 

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# Glossary

AAA Abdominal aortic aneurysm ABPIs ankle brachial pulse index

Ang2 Angiotensin 2

ACE Angiotensin converting enzyme BM Finger prick glucose measurement

BMI Body Mass Index BP Blood pressure

CHD Coronary heart disease

CI Contra-indication C-peptide Insulin C-peptide

CSII Continuous subcutaneous insulin infusion

CT Computer tomography
CVA Cerebrovascular disease
CVD Cardiovascular disease
CXH Charing Cross Hospital

CXR Chest X-ray
DM Diabetes mellitus
DI Diabetes insipidus
DKA Diabetic ketoacidosis
DNS Diabetic nurse specialist

DP Dorsalis pedis

DVLC/DVLA Driving and vehicle licensing authority

DVT Deep venous thrombosis

ECG Electrocardiogram

ETT Exercise Tolerance Test
HGV Heavy goods vehicle
HH Hammersmith Hospital

HONK Hyperosmolar non-ketotic state GDM Gestational diabetes mellitus

GI Gastrointestinal
GP General Practitioner
IFG Impaired fasting glucose
IGT Impaired Glucose Tolerance
IHD Ischaemic heart disease

IM Intra muscular IRMAs Intra retinal IV Intravenous

JPS Joint position sense LP Lumbar puncture

LT Light touch

MELAS Mitochondrial myopathy, encephalopathy, lactacidosis and stroke

MI Myocardial infarction

MODY Maturity onset Diabetes on the young

MSU Mid stream urine

NVD
 Neovascularisation of the disk
 NVE
 Neovascularisation elsewhere
 NVI
 Neovascularisation of the iris
 OGD
 Oesophago-gastroduoenoscopy

OGTT Oral glucose tolerance test

OM Osteomyelitis

PGR Prandial glucose regulator

PP Pin prick sensation PSV Public service vehicle

PT Posterior tibial

PVD Peripheral vascular disease

SC Sub Cutaneous

SRD State registered dietician

SU Sulphonylurea

TIA Transient ischaemic attach

UKITC UK is et cell transplantation consortium

VS Vibration sense

Wt Weight

# **Referrals and Contacts**

## **Urgent referrals:**

Telephone Endocrine Registrar and Diabetes specialist nurses and Fax referral letter

- 1. Likely to need insulin
  - Significant ketonuria at any age
  - Young, non-obese, ill, vomiting or rapid wt loss
- 2. Risk of Non-ketotic hyperosmolar coma
  - ,Elderly, intercurrent illness, glucose >25
- 3. Sudden deterioration in visual acuity
- 4. Foot ulceration
- 5. Pregnancy

## **Routine referrals:**

## Supply the following information to assess priority

- 1. Diagnostic criteria for DM (ie fasting, random or OGTT results)
- 2. Latest HbA1c
- 3. Body Mass Index and weight change
- 4. Symptoms (severity, duration, rapidity of onset)
- 5. Blood pressure
- 6. Evidence of existing complications
- 7. All present medications
- 8. Past medical history
- 9. Occupation and contact number (working hours)

## **Contact Numbers**

## **Hammersmith Hospital**

Endocrinology/Diabetes Secretaries Tel: 020 8383 4828 Fax: 020 8383 3360 Tel: 020 8383 4693 Fax: 020 8383 2348

Podiatary Tel: 020 8383 4616 Dietetics Tel: 020 8383 3048

Appointments Tel: 020 8383 5000 Fax: 020 8383 8383

24h emergency contact number Tel: 020 8383 1000 (Ask for endocrine SpR)

#### **Charing Cross Hospital**

Endocrinology/Diabetes Secretaries Tel:020 8846 1065 Fax: 020 8846 1862

Diabetic Nurse Specialists Tel: 020 8846 1062 Fax: 020 8846 1080

Podietary Tel: 020 8846 1621 Dietetics Tel: 020 8846 1445

Appointments Tel: 020 8383 5000 Fax: 8346 7564

24h emergency contact number Tel: 020 8383 1000 (Ask for endocrine SpR)

# **Background and Introduction**

## **Background**

Since the first version of the diabetic handbook in 1993 the DCCT and UKPDS studies have greatly increased the evidence base for the management of Diabetes and these revised guidelines have been prepared over 2001-2002 to document in a readily accessible form our standard practice in both the in and out patient settings of secondary care.

## Introduction

These guidelines have been primarily developed in a highly visual flow chart format for the use of medical staff in secondary care but may also be of use to primary care. The guidelines contain information on departmental policy as regards patient referrals, discharges and patient DNAs together with copies of standard letters and proformas.

The Hammersmith Hospitals trust diabetic clinics has around 5,000 patients under follow up and received more than 900 referrals per year and these guidelines aim to help deliver a consistently high quality service to our patients, to improve communication between primary and secondary care and to reduce waiting times for both new and follow up appointments.

# **Diabetes Diagnosis and Classification**

#### A) Presenting and associated features

Polyuria, Polydipsia, Nocturia, Weight loss, Blurred vision

Recurrent cutaneous sepsis, Balanitis, Pruritis vulvae

Foot ulcers, Neuropathy

Ischemic heart disease, Cerebrovascular disease

Peripheral vascular disease

#### B) Risk Factors

Ethnicity, Indian-Asian, Afro-Caribbean, Middle -Eastern

First Degree Relative

Obesity

Recurrent stillbirths; babies > 4.5Kg

#### C) Diagnostic Criteria

#### HBA1c CAN NOT BE USED FOR DIAGNOSIS

#### 2x Random Glucose Measurement (1x if symptomatic)

=11.1 Diabetes Mellitus

<11.1 Normal if =6.1 do 2x fasting

#### 2x Fasting Glucose Measurement (1x if symptomatic)

=7.0 Diabetes Mellitus

=6.1 but <7.0 Impaired Fasting Glucose do OGTT

#### **Oral Glucose Tolerance Test 2h Glucose**

=11.1 Diabetes Mellitus

=7.8 but <11.1 Impaired Glucose Tolerance

<7.8 Normal

#### D) Aetiology of Diabetes Mellitus

**Type I diabetes**: Idiopathic or autoimmune immune mediated  $\beta$  cell destruction leading to insulin deficiency **Type II diabetes**: Insulin resistance with relative insulin deficiency associated with obesity, hypertension and

dyslipidaemia

#### E) Other Causes

#### Genetic defects of **b** cell function

Mitochondrial: maternal inheritance (nt3243 of Leu tRNA identical to MELAS mutation)

Wolfram's syndrome: AR lack of β-cells (DM,DI,hypogonadism,deafness,optic atrophy)

Maturity-Onset Diabetes of the Young (MODY): <25yr. dominant, impaired insulin secretion

MODY-1 : (20q) hepatic nuclear factor- $4\alpha$ ?

MODY-2: (7p) Defective glucokinase

MODY-3: (12q24) hepatic nuclear factor-1α? most common

? MODY-4 insulin promotor factor 1(IPF-1) and hepatic nuclear factor-1\( \beta \)?

#### Genetic defects in insulin action

Type A insulin resistance: associated with acanthosis nigracans and PCOS

Leprechaunism: insulin receptor mutation abnormal facial features

Rabson-Mendenhall syndrome: insulin receptor mutation abnormal teeth, nails, pineal

Lipodystrophy: error in post insulin receptor signalling

#### Pancreatic Destruction

Cystic fibrosis, pancreatitis, pancreatic surgery, haemachromatosis

#### **Endocrinopathies**

Hyperthyroidism, Cushings, Acromegaly, Glucagonoma, Pheochromocytoma

## **Drug induced**

Glucocorticoids; Thyroxine, thiazides,  $\beta\text{-blockers},$  Nicotinic acid, phenytoin, protinase inhibitors Gestational Diabetes

# **Impaired Glucose Tolerance**

#### **Definition of IGT**

Oral glucose tolerance test 2h sample greater than or equal to 7.8 but <11.1

#### **Incidence and progression of IGT**

Present in 10% to 30% of >65 year olds

On repeat testing

30% revert to normal on repeat testing

50% continue to show IGT

20% are diabetic

(Progression to overt diabetes occurs at 5-10% pre year)

Patient with IGT have increased risk coronary artery, peripheral vascular and cerebrovascular disease.

#### Management

Annual fasting glucose: proceed to OGTT if greater than or equal to 6.1 but <7.0 Annual blood pressure and lipids

Avoid thiazides,  $\beta$ -blockers and oral steroids when possible

#### Life style advice

Aim for BMI of 25

If BMI>30 consider

- 1. Orlistat 120mg with meals (2.5Kg loss in 4 weeks before starting and stop if <5% wt loss in 3 months)
- 2. Sibutramine 10mg od (15mg after 1 month if <2kg loss) (Stop if wt loss <5% in 3 months)
- 3. Metformin 500mg bd

Regular exercise average of 30min/day

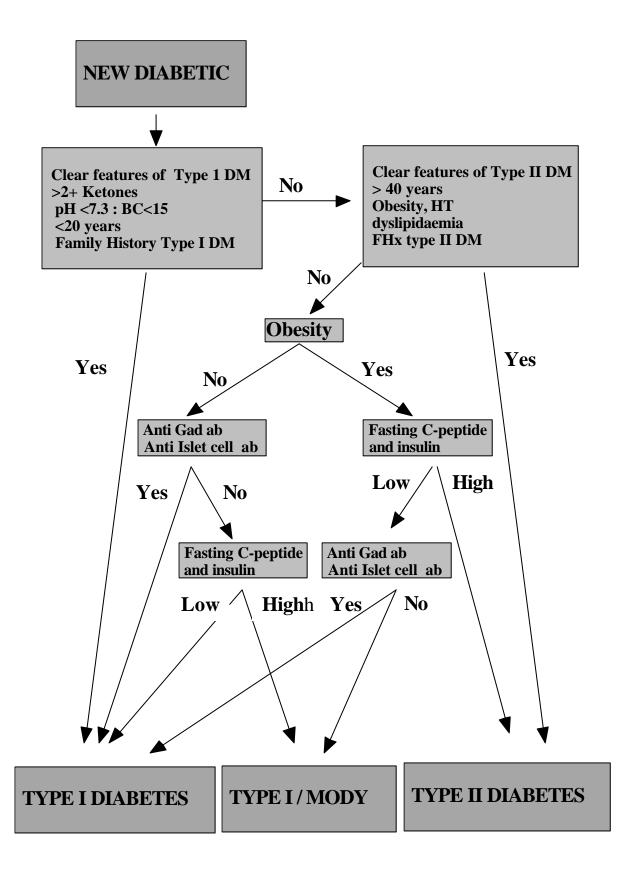
Stop smoking

Moderate alcohol intake may be beneficial

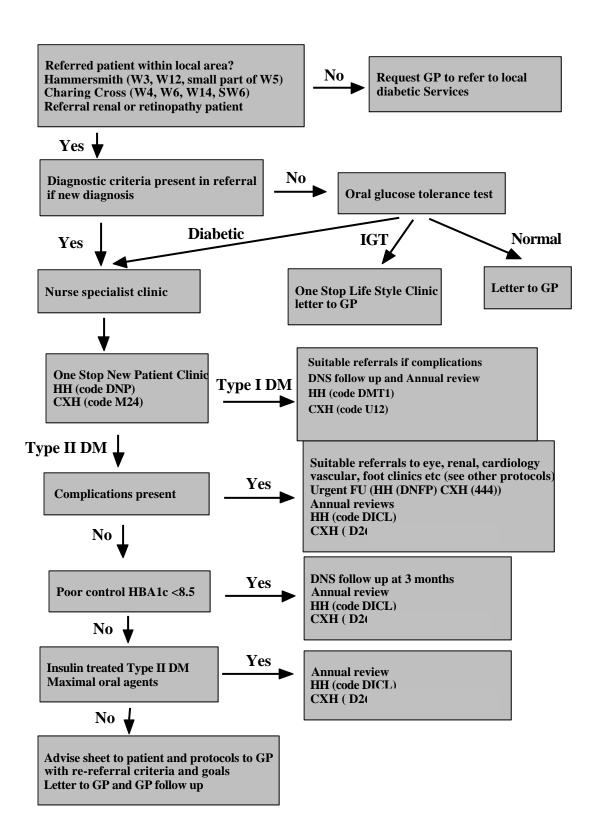
Dietary advise on cholesterol lowering (treatment if 10y CHD risk >30%)

Minimising these risk factors can reduce the incidence of diabetes by 50%

# **Types of Diabetes Mellitus**



# **Management of New Diabetic Referrals**



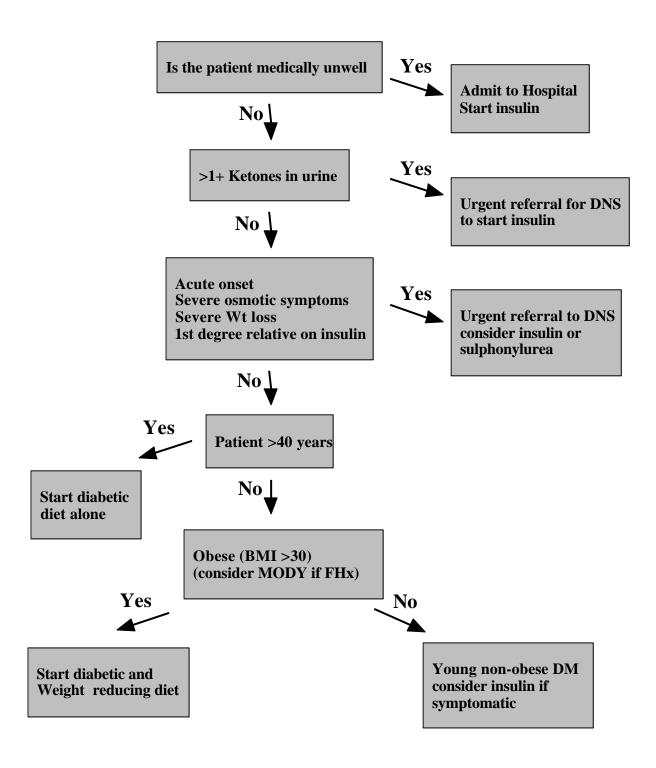
# **Nurse Specialist Assessment**

AIM: To enable the patient to understand and accept their diabetes, and to try and minimise the long-term complications.

Education is tailored to the patient's need topics include

- 1) Explanation of diabetes and complications
- 2) Management of diabetes
- 3) Learning skills: Blood glucose monitoring, urine testing, insulin injection
- 4) Discussion of pre conceived ideas and patients questions
- 5) Emergency contact number
- 6) Information on Diabetes UK
- 7) Institute initial management

# **Initial Assessment of Treatment**



# **New Patient Medical Assessment**

See Proforma 1

**RECORD**: Wt; height; random glucose; urine dipstick and pin-hole acuity

#### History to include

Patient's occupation and ethnic origin

#### Record date of diagnosis and diagnostic criteria

2x random glu =11.1 or 2x fasting glu =7.1 or OGTT 2h glu >11.1

Presumed type of diabetes mellitus

#### Presentation

Hospital admission with DKA or HONK

Polyuria, polydipsia, visual disturbance, weight loss

Infections: cutaneous, foot, urinary tract, balinitis, pruritis vulvae

#### Record known previous complications

IHD, PVD, CVD, retinopathy/cataracts, neuropathy, nephropathy, ulcers, impotence

#### **Directly question regarding**

Exercise related chest pain

Intermittent claudication

Foot infections and symptoms of peripheral neuropathy

Erectile dysfunction

Visual disturbances

#### Assess present control

HBGM results: hypo and hyperglycaemic episodes

Dietary compliance, exercise regime

Has the patient seen the diabetic nurse specialist and dieticians?

#### **Obstetric history**

Number of pregnancies; miscarriages; stillbirths, birth weights and mode of delivery

History of gestational diabetes, future pregnancy plans and contraception

#### Family history

Diabetes mellitus, thyroid disease, hypertension, renal disease

IHD, CVD, PVD with age of onset

#### Full list of medication and drug allergies

#### **Social history**

Smoking history, alcohol intake

Driving (check informed DVLC and insurance company)

Assess occupational risks (driving or machinery etc)

#### Physical Examination to include

General, cardiovascular, respiratory and abdominal systems

#### Specifically record

Evidence of hyperlipidaemia (arcus, tendon xanthomata etc.)

Pulse, blood pressure lying and standing, heart sounds, carotid bruits

Peripheral pulses: abdominal, femoral, dorsalis pedis and posterior tibials

Reflexes at the knee and ankle

Lower limb sensation; vibration, 10g microfilament, pinprick

Feet: General skin, nails, ?fungal infection and deformity, ?Charcot's

Visual acuity, presence of cataracts and dilated fundoscopy

#### Investigations to include

**FBC** 

Renal function, Liver function and GGT, Calcium, (Vitamin D if Asian origin)

Thyroid function,

Fasting Cholesterol, Triglycerides, HDL, LDL, Chol/HDL ratio

Glucose and HBA1c

Random urinary albumin /creatinine ratio

ECG and CXR if indicated

B<sub>12</sub>, folate and tissue specific autoantibody screen in Type I (including anti GAD and anti-islet cell)

#### Repeat fasting blood test 2 weeks before next clinic

U&E, LFT, TFT, Chol, Tg, HDL, LDL, Glu, HBA1c and (CK, GGT if on a statin/glitazone)

## **New Patient Dietetic Assessment**

#### NEW DIABETIC PATIENT DIETETIC REVIEW



#### St VINCENT DECLARATION

Set standards for care of people with diabetes

"People with diabetes should have access to expert nutritional and dietary advice Should see state registered dietitian within 4 weeks of diagnosis and then annually National Service Framework for Diabetes

Proposes a pathway of care where dietary management has a role from prevention to the management of complications



#### INITIAL APPOINTMENT WITH SRD

Explanation of diabetes, risk of complications, role of diet in treatment Collection of baseline information co-morbidities

**Record parameters** 

Weight

Height

**BMI** 

Waist circumference,

**Glucose and Biochemistry** 

**Drugs** 

Review of diet diary, 24h diet history, activity levels Set and agree dietary, activity and weight targets Aimed at prevention or reduction in risk factors

**Optimal diet** 

**Lipid lowering** 

Weight loss

Improving glycaemic control

**Blood pressure reduction** 

**Improved nutritional status** 



#### **SET GOALS**

Specify the dietary goals set

**Encouragement** 

Motivation

**Support** 

Arrange follow up appointments as necessary

# **Driving and Diabetes Mellitus**

Adapted from DVLA Medical standards of fitness to drive Feb 2002 (App.I)

All patients must inform the DVLA of diagnosis and will be sent detailed information

#### **Insulin treated diabetes**

Car drivers: Must recognise warning signs of hypogycaemia and meet visual

standards

HGV/PSV: Applicants since 1/4/91 barred from driving.

Drivers licensed before 1/4/91 require annual consultant certificate. Since April 2001 allow 'exceptional cases' to apply for or retain their

entitlement to drive class C1 vehicles (3500kg – 7500kg) subject to an annual

medical

#### **Temporary insulin treatment** (Gestational DM or Post MI)

Car drivers: Notify DVLA. May drive but must stop if severe hypos.

Must notify DVLA if continues insulin treatment continues for > 3 months

HGV/PSV: May not drive, reapply for licence when not on insulin

#### Oral hypoglycaemics

Car drivers: Retain licence until 70y unless visual acuity or fields affected

HGV/PSV: Licensed unless acuity or fields affected

#### **Diet only**

Car Drivers: To notify DVLA if visual acuity or fields affected HGV/PSV: Licensed unless visual acuity or fields affected

#### **Diabetic Complications**

#### Frequent Hypoglycaemia or hypoglycaemic unawareness

Car drivers: Stop driving until control back to normal (medical report to DVLA)

HGV/PSV: May not drive

#### Visual Problems

Car drivers: Must be better than 6/9 to 6/12 corrected and fields >120<sup>0</sup> horizontal

HGV/PSV: Must be 6/9 or better in best eye (corrected)

Must be 6/12 or better in worst eye (corrected)

Uncorrected better than 3/60 in both

Normal visual fields

#### **Renal Problems**

Car drivers: No restriction unless dizziness, fainting or cognitive problems

HGV/PSV: Individual assessment by DVLA

## The Annual Diabetic Review

See Appendix III

RECORD: Wt, Wt change; BMI; random glucose; urine dipstick result and acuity

## **History Examination and Investigation**

#### **Record accurately**

Present age, type of diabetes, age of onset/duration, complications

Other clinical diagnoses

Smoking status

Full list of present medications

#### List Recent Results (from 2 weeks prior to clinic)

HBA1c, Chol, Tg ,HDL, LDL, Chol/HDL, Cre, Alb/Cre ratio, FT4, TSH, LFT (GGT and CK if on a statin)

#### **Assess present control**

Record home blood glucose monitoring

Record hypo and hyperglycaemic episodes

Dietary compliance

Level of regular exercise

#### **Directly question regarding**

Exercise related chest pain

Intermittent claudication

Foot infections

Symptoms of peripheral neuropathy

Visual disturbance

Erectile dysfunction

Pregnancy or plan for pregnancy and contraception

Chiropody

#### **Physical Examination**

#### Specifically record

Blood pressure lying and standing

Peripheral pulses: dorsalis pedis and posterior tibials

Reflexes at the knee and ankle

Lower limb sensation: vibration, 10g microfilament and pinprick

Feet: General skin, nails, fungal in fections, deformity/Charcot's, Ulcers

Visual acuity, presence of cataracts and dilated fundoscopy

#### Repeat fasting blood test 2 weeks before next clinic

U&E, LFT, TFT, Chol, Tg, HDL, LDL, Glu, HBA1c and (CK, GGT if on a statin/glitazone) Random albumin/creatinine ratio

**Dietetics Review** at least every 2 years

# **Insulin Treatment in Type I DM**

STARTING INSULIN TREATMENT IN TYPE I DM Consider the patients age, lifestyle, physical activity an



#### TWICE DAILY MIXED INSULIN

FIXED RATIO(short acting/long acting insulin) Mixtard 30/70 or Humulin M3 Taken before breakfast and supper Starting doses 15u morning 8u evening Mix25 also now available Advantages

2 injections per day

Disadvantages Inflexible if variable life style Midday glucose difficult to regulate Sub optimal glycaemic control



#### BASAL BOLUS INSULIN

(Discuss with all <35y on bd and use in pregnancy Actrapid/Humulin S before meals 3x per day Insulatard/Humulin I at 10pm

Starting doses from bd : Reduce total dose by 10% Short acting: 20% of total 3 times a day

Long acting: 40% at 10pm

Starting dose de novo

Short acting: 6u 3 times a day before meals Long acting: 8u at 10pm

**Advantages** 

Flexible for active variable life style ie exercise, meal times and meal sizes

Disadvantages

4 injections per day, nocturnal hypoglycaemia needs regular monitoring during day



#### FIVE TIMES A DAY REGIMEN

(Consider if recurrent hypes or nocturnal hypes and rebound hyperglycaemia: Somogyi phenomen Humalog/Novorapid 3x with meals Insulatard/Humulin I before breakfast and 10pm Starting dose from basal bolus

Short acting: same dose 3 times with meals Long acting: 30% total am; 70% total pm

highly flexible for young with active life

Reduced risk of nocturnal hypoglycaemia **Disadvantages** 

5 injections per day, intensive monitoring



#### INSULIN ANALOGUES

(Consider if recurrent hypos or nocturnal hypos)

Humalog/Novorapid 3x per day with meals

Insulin Glargine at 10pm

Starting from five times a day regime

Short-acting - Breakfast - reduce by 20%

same dose with lunch and supper

Glargine - calculate total long-acting dose and reduce by 20-30%

Improve d quality of life

# **Commonly Used Human Insulins**

Most insulin is used with 3ml re-loadable cartridge pens. 1.5ml cartridges are no longer available

**Humapen and Novopen** 

Disposable pens are also available for ease of use

Special pens are available for partially sighted and elderly

Long acting

Insulin Glargine flat profile duration 24h

**Intermediate acting** 

Insulatard peak 5h duration 10h Humulin I peak 5h duration 10h

Fast Acting (Taken 30 minutes before meals)

Actrapid peak 2h duration 7h Humulin S peak 2h duration 7h

**Very Fast Acting (Taken with or after start of meals)** 

Humalog (Lispro) peak 1h duration 4h Novorapid peak 1h duration 4h

**Mixtures of Human Insulin** 

Human Mixtard 30/70 (30% Actrapid : 70% Insulatard) also available 10/90, 20/80, 40/60, 50/50

Humulin M3 (30% Humulin S and 70% Humulin I) Also available M2, M5

**Mix25** (25% **Humalog** : 75% **Humulin I**)

# **INSULIN GLARGINE**

**Insulin Glargine** is a long acting human insulin analogue prepared by modifying the structure of insulin to allow more consistent release during the day and thereby mimicking natural basal insulin release.

Glargine maintains a basal concentration of insulin in the blood which can then be increased by injections of short-acting insulin analogues as required. It is used as the basal component of a basal-bolus regime. The prolonged action of glargine, without pronounced peaks over 24 hours, make it ideal for this purpose.

Glargine does not require resuspension before use and this reduces intra and inter-user variability.

In type I diabetes, 3 studies have shown a significant improvement in fasting blood glucose. One study reported a significant improvement in HbA1c though the study was only 4 weeks duration. The manufacturers report a 1.7% reduction in HbA1c. One study reported a significant reduction in nocturnal hypoglycaemic episodes, though this was not supported by 2 other studies. The manufacturers report a 70% reduction in hypoglycaemic episodes.

In type II diabetes, glargine produces no change in fasting blood glucose or HbA1c according to 2 randomised controlled trials but the manufacturers report a 1.4% reduction in HbA1c. Both RCTs report a significant reduction in nocturnal hypoglycaemic episodes.

## **NICE guidelines**

Glargine is a treatment option for **all** patients with type I diabetes

Glargine should only be considered in type II diabetes under the following circumstances

- a) The individual requires assistance from a healthcare professional to administer insulin.
- b) The individual's lifestyle is severely restricted by recurrent symptomatic hypoglycaemic episodes.
- c) The individual would otherwise use twice daily basal insulin in combination with oral hypoglycaemic agents.

# Alternatives to s/c Insulin in Type I Diabetes

BRIEF REVIEW OF ALTERNATIVE TREATMENT OF TYPE 1 DM



#### INSULIN PUMP THERAPY (In UK 1:1000 Type I DM)

**Continuous Subcutaneous Insulin Infusion (CSII)** 

Pump driven infusion of soluble insulin subcutaneously via a cannula into the abdomen Continuous background dose and boluses before meals

Candidates for consideration of insulin pump

Very motivated to take control of own DM and do 4 blood sugars every day Good understanding of Type 1 DM and effects of insulin, exercise and food

Young type I DM unstable control (hypos/hypers) on 5 times a dayasal bolus

Young type I DM poor control and early reversible microvascular complications

Poor control on basal bolus in pregnancy

Sufficient financial resources or health authority funding (initial £2000 & annual £0 Advantages

Improved glycaemic control over basal bolus and quality of life

Reduce risk of complications

Help in restoration of hypoglycaemic warning symptoms

Disadvantages

Motivated patients with good knowledge only

Expensive initial equipment £2000 and then £600 per year paid by patient

**Experience required by health professionals** 

Needs 24h help line

Pump failure can lead to rapid DKA

Infections at infusion site



#### ISLET CELL TRANSPLANTATION

Islet cell transplantation in Type I DM is a research trial only at present

UKITC c/o Research and Information Dept 10 Queen Anne Street London W1G 9LH

**UK Islet Cell Transplantation Consortium : planned facilities** 

King's College London, Royal Free Hospital London

Addenbrookes Hospital Cambridge, John Radcliffe Hospital Oxford

Worcester Acute Hospital, University College Leicester, Southmead Hospital Bristo

**Patient Selection Criteria** 

Type I DM between 18 and 65 years

Failure of control and severe hypoglycaemia on optimal 5x per/day regime early microvascular complications

**Exclusion Criteria** 

**Renal Disease** 

Insulin resistance

repeated episodes DKA

EDMONTON PROTOCOL (Shapiro et al NEJM 2000 343 : 230-238)

Islets

Isolated from human pancreas (11,000 islets per Kg of recipients weight ) Cross matched for blood type and lymphoytotoxic ab but not HLA

Transplant

Percutaneous transhepatic access to portal vein under sedation

Islets infused over 5 min in 120ml of medium

Immunosuppression

Sirolimus od, Tacrolimus bd and daclizumab iv 5x 2 weekly

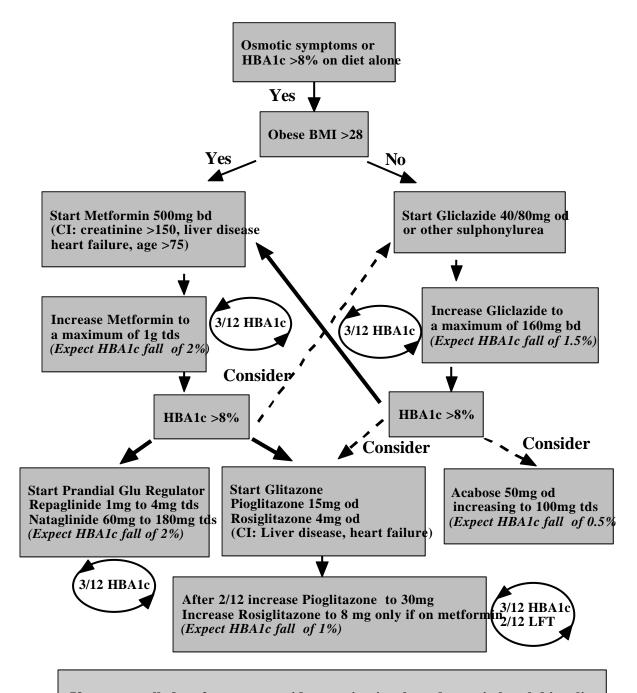
**Prophylaxis** 

IV vancomycin, Imipenem, VitE/B/A, inhaled Pentamidime monthly oral gancyclovir tds for 14 weeks post transplant

Results

All patients required islets from at least 2 pancreases 7/7 had insulin independence and normal HBA1c at 1y FU

# Oral Hypoglycaemics Type II DM



If not controlled on 2 agents consider evening insulatard or switch to bd insulin

# **Oral Hypoglycaemic Agents**

#### Sulphonylureas (Expect reduction in HBA1c of 1 to 1.5%)

Action: Stimulate pancreatic insulin secretion

(Closes K<sup>+</sup> channels opens Ca<sup>2+</sup> channels resulting in incised insulin secretion)

Gliclazide initial dose 40mg od before meals titrate monthly to max of 160mg bd

Risk of hypoglycaemia and weight gain average 5Kg

Avoid long acting sulphonylureas in patients >70y,

Avoid sulphonylureas in severe renal impairment (Cre>350) and liver disease

Gliclazide (40mg od to 160mgbd) short acting

Tolbutamide (0.5g od to 1g bd) short acting low incidence of hypoglycaemia

Glimepiride (1mg od to 4mg od) long acting avoid in >70y

Glibenclamide (5mg od to 15mg od long acting avoid in >70y

#### **Biguanides** (Expect reduction in HBA1c of 0.8 to 2%)

Action : Increases muscle glucose uptake and decreases hepatic gluconeogenesis does not result in wt loss or gain

Metformin initial dose 500mg bd with me als titrate monthly to maximum 850mg tds

Risk of GI disturbance, lactic acidosis, renal impairment with radiographic contrast

Avoid in hospital inpatients, renal impairment (Cre>150), liver disease, heart failure and pregnancy

IV contrast: Do not take metformin 48h before or after IV contrast

#### Acarbose (Expect reduction in HBA1c of 0.5%)

Actions: α-glucosidase inhibitor delayed glucose absorption

Acabose initial dose 50mg od increasing slowly to 100mg tds with meals

Risk of GI disturbance frequent poor compliance

#### **Prandial Glucose Regulators** (Expect reduction in HBA1c of 1% to 2%)

Actions: Rapid short action via the sulphonylurea receptor stimulating insulin release

Repaglinide 0.5 to 4mg 15 minutes before meals (max 16mg/d)

Nateglinide 60 to 180mg 15 minutes before meals (maximum 540mg/d)

Possible benefits: less wt gain and hypoglycaemia, can be used with metformin

Repaglinide may be used as monotherapy and both in renal impairment

Neither to be used with sulphonylureas or in pregnancy

Risks GI disturbance: avoid in severe hepatic or renal impairment and pregnancy

#### **Thiazolidinediones** (Expect reduction in HBA1c of 1%)

Actions: PPARy nuclear receptor activator (peripheral insulin sensitisation)

Indicated for use in inadequately controlled diabetics on

- suphonylurea but intolerant of metformin
- obese patients on metformin.

Not licensed currently for use as monotherapy or with insulin

Pioglitazone 15mg od increasing to 30mg od

Rosiglitazone 4mg od increasing to 8mg od after minimum of 2 months (only with metformin)

Risks GI disturbance, wt gain and oedema

Avoid in hepatic impairment, heart failure and pregnancy

Monitor liver function at baseline and every 2 months for first year (stop if ALT 3x normal upper limit)

# **Insulin Treatment in Type II Diabetes**

Fatigue, lethargy, gradual weight loss

**Osmotic symptoms (check for ketones)** 

**Symptoms of Insulin deficiency** 

CONSIDER INSULIN TREATMENT IN TYPE II DM

BMI<25, neurophathic pain Poor glycaemic control on maximal oral treatment **HBA1C >8.5% Deteriorating renal function need to stop metformin** YES \_ PATIENTS WITH INSULIN DEFICIENCY NO Stop all oral hypoglycaemics **Commence twice daily Insulin** Mixtard 30/70 15u and 10u or Humulin M3 15u and 10u Diabetic Nurse Specialist teach insulin technique **Dietitians review** PATIENTS ON MAXIMAL ORAL TREATMENT Leave on metformin and SUs stop glitizones **Commence Nocturnal** Insulatard 10u or Humulin I 10u Diabetic nurse specialist teach insulin technique **Dietitians review** Diabetic nurse review with **HBA1c** every 3 months Increase dose by 2u/week until fasting glucose 7 May need up to 50u nocte Diabetic nurses review with HBA1c every 3 months If not effective at reducing HBA1c Stop sulphonylurea Continue metformin 500mg bd up to 1g bd **Commence twice daily Insulin** Mixtard 30/70 15u and 10u or **Humulin M3** 15u and 10u Diabetic Nurse Specialist teach insulin technique Dietitians review advice on weight gain

# Recurrent Hypoglycaemia

Acute Severe Hypoglycaemic Episode See in-patient protocols Non Acute Well controlled patients often have 2 or more episodes per week Symptoms usually occur at glucoses of 2.0 to 3.0 Review blood glucose monitoring, note all levels <4.0mmol/l **Review HBA1c** Are episodes symptomatic Are there precipitating causes Missed meals Exercise or alcohol related Nocturnal Medication change (Steroids, ACE inhibitors) Sporadically high morning readings suggesting nocturnal hypoglycaemia? **Insulin Treatment** YES Consider Injection sites Dietary or behavioural modification Dietary and behavioural modifications Simple reduction in medication Adjust dose before exercise If on sulphonylurea ensure short acting Reduction in insulin dose Gliclazide or Tolbutamide If on short acting sulphonylurea try If on mixed insulin - change ratio Metformin or prandial glucose regulator If on mixed insulin - change to basal bolus (repaglinide or nateglinide) If on actrapid - change to humalog or novorapid If on insulatard - change to glargine **Consider other causes** Renal impairment (check U&E and FBC) Malabsorption (check anti endomysial/gliadin ab, B12, Folate) **Gastroparesis** (see other protocol) Addison's (check random cortisol and U&E) Pregnancy (pregnancy test if amenorrhoea) Advise on hypoglycaemic treatment (Glucose tablets, glucagon and identity bracelet/card) Advise on driving and risk occupations Frequent hypoglycaemia (Must stop driving until controlled ) Loss of hype awareness (Must tell patient to stop driving and you must inform the DVLC)

driving can resume after careful glucose control and specialist report of normal hype awareness If patient continues to drive you must inform the DVLC medical adviser and tell the patient)

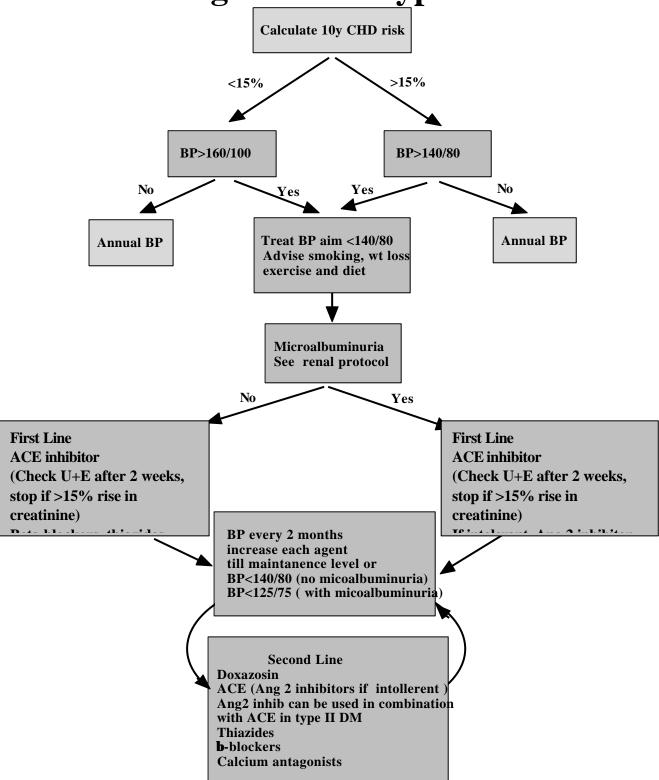
Dietetic review

DNS follow up 3 months

Diabetic review 3 months on emergency code

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# **Management of Hypertension**



#### **Guidelines for starting ACEI or Ang2 inhibitors:**

- Check U+E after 1-2 weeks stop if Cr rises by > 15%
- Stop thiazides whilst initiating treatment to avoid volume depletion
- Discontinue NSAIDs
  - If significant DVD noufour MDA to avaluate usual outcome stonesis

## **Hypertension Data**

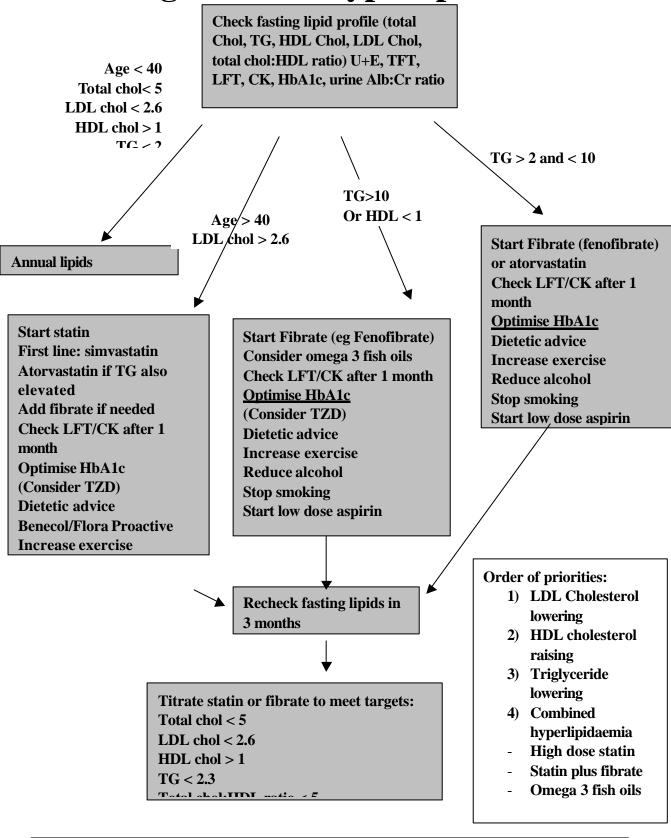
- Hypertension occurs more frequently in patients with diabetes than in the general population. 40% of newly
  diagnosed subjects enrolled in the UKPDS had were hypertension and this increased during the study to being 48%
  of all men and 54% of all women
- In type 1 diabetes the incidence of hypertension increases with increasing duration of diabetes and frequently has a renal origin
- In type 2 diabetes hypertension is frequently part of the insulin resistance syndrome occurring with other cardiovascular risk factors.
- Hypertension is significant contributor to micro and macrovacular disease in both type 1 and type 2 diabetes
- In the type 2 diabetic subjects enrolled in the UKPDS for each 10 mm Hg decrease in mean systolic blood pressure there was associated with reductions in risk of 12% for any complication related to diabetes
- The third working party of the British Hypertension Society based the decision to treat hypertension in non-diabetics subjects with a sustained systolic BP of 140 159 mm Hg or sustained diastolic BP of 90-99 mm Hg on the presence of end organ damage, cardiovascular disease or a 10-year coronary heart disease risk of =15%. As the majority of diabetic patients will have a coronary heart disease risk of =15% and microvascular and macrovascular complications increase with increasing blood pressure the report recommended initiating antihypertensive drug therapy in diabetic subjects with a sustained systolic BP =140 mm Hg or sustained diastolic BP is =90 mm.
- Angiotensin-converting enzyme (ACE) inhibitors are the first line hypertensive agent for patients with type 1
  diabetes as they has proven renal protective properties. All diabetic subjects with micoalbuminures should receive
  an ACE-inhibitor or an A-II receptor antagonists if intolerant to the former.
- A-II receptor antagonists provide some theoretical advantages over ACE inhibitors in that they directly inhibit A-II by binding to the AT(1) receptor subtype thereby blocking all A-II action at this receptor even when generated through the non classical renin-angiotensin pathways. A-II receptor antagonists have also been shown to significantly reduce the progression of diabetic renal disease in patients with type 2 diabetes.
- Many hypertensive diabetic patients require three of more antihypertensive agents to control blood pressure. Thiazides and β-blockers remain effective and useful first treatment options given alone or in combination. In the UKPDS atenolol was equally effective as the ACE-inhibitor captopril however was significantly cheaper.
- Doxacacin and long acting dihydropyridine calcium antagonists are effective second line agents ideally suited for combination with ACE-inhibitors, Thiazides and β-blockers if blood pressure target are not met.

## **Key References**

- Association of systolic blood pressure with macrovascular and microvascular complications of type 2 diabetes (UKPDS 36): Adler AI. Stratton IM. Neil HA. Yudkin JS. Matthews DR. Cull CA. Wright AD. Turner RC. Holman RR..BMJ. 321(7258):412-9, 2000
- Guidelines for management of hypertension: report of the third working party of the British Hypertension Society. Ramsay L. Williams B. Johnston G. MacGregor G. Poston L. Potter J. Poulter N. Russell G. Journal of Human Hypertension. 13(9):569-92, 1999

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# Management of Hyperlipidaemia



Stop statin or fibrate if transaminases over  $3\,\mathrm{x}$  upper limit of normal or CK greater than  $1000\,\mathrm{c}$ 

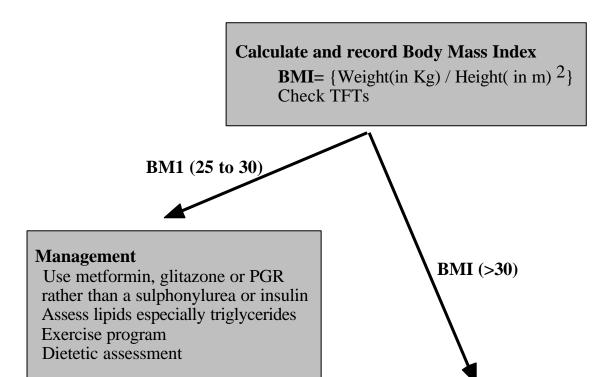
## Hyperlipidaemia Data

- All diabetic patients should receive dietary advice on reducing their dietary fat intake, replacing saturated fat with
  monounsaturated rich fats and oils and on the use of low fat spreads and fat substitutes, ie the use of Benecol and
  other plant stanols and sterols. Patients should be made aware of how to lower their CVD risk through life style
  changes.
- Total cholesterol and serum triglycerides in the newly diagnosed patients enrolled in the UKPDS were significantly higher than for the general population. Although the HDL concentration in the diabetic women in the UKPDS were higher than the men by 7% this sex differential was considerably less than for the general population in which it was 22%.
- The Multiple Risk Factor Intervention Trial (MRFIT) demonstrated for or any given level of cholesterol, the incidence of coronary artery disease in diabetes is increased 2-4 times.
- The Scandinavian Simvastatin Survival Study (4S) and Cholesterol and Recurrent Events Trial (CARE) were secondary intervention trials using a statins (simvastatin, and pravastatin) that performed post hoc analyses of the diabetic subgroups. Despite the limitations of such subgroup analyses, these studies strongly suggest that treating hypercholesterolemia in diabetes will reduce the risk of recurrent cardiac events in individuals with pre-existing CAD..
- West of Scotland Coronary Prevention Study Group.(WOSCOP) showed evidence of a statin (pravatatin) in the
  primary prevention of CVD specific studies on the use of statins for the primary prevention of CVD in diabetics are
  awaited.
- Satins also provide protection against stroke and peripheral vascular disease
- In diabetic patients with a low HDL cholesterol and low or normal LDL concentrations fibrates offer good secondary protection against further CVD and stroke. In the Department of Veterans Affairs Intervention Trial (VA-HIT) subjects with established CVD and low HDL cholesterols but normal LDL concentrations were randomized gemfibrozil (1,200 mg/day)or placebo for 5 years. Of the 627 diabetics (25% of the study population) gemfibrozil resulted in a 24% relative risk reduction in CVD end points (CHD death, nonfatal myocardial infarction, and definite stroke) compared with placebo.
- Fibrates are first line management in diabetic patients with significant hypertriglerideaemia. A meta-analysis of 17 population-based studies (46 000 men and > 10 000 women) showed that risk of CVD increased by ~30% in men and by ~75% in women for every 1 mmol/l increase in triglycerides. A recent trail on progression of coronary atherosclerosis in type 2 diabetes over 3 years assessed by angiographic criteria showed in a placebo controlled trial micronised fenofibrate (200 mg/day) a showed a significantly smaller increase in percentage diameter stenosis with the fibrate than the placebo group.

## **Key References**

- Rubins HB, Robins SJ, Collins D. The Veterans Affairs High-Density Lipoprotein Intervention Trial: baseline characteristics of normocholesterolemic men with coronary artery disease and low levels of high-density lipoprotein cholesterol. *Am J Cardiol* 1996;78:572-575.
- Hokanson JE, Austin MA. Plasma triglyceride level is a risk factor for cardiovascular disease independent of high-density lipoprotein cholesterol level: a meta-analysis of population-based prospective studies. Journal of Cardiovascular Risk 1996; 3:213-219.
- U.K. Prospective Diabetes Study Group: U.K. Prospective Diabetes Study 27: plasma lipids and lipoproteins at diagnosis of NIDDM by age and sex. *Diabetes Care* 20:1683-1687, 1997
- Scandinavian Simvastatin Survival Study Group: Randomized trial of cholesterol lowering in 4,444 patients with coronary heart disease: the Scandinavian Simvastatin Survival Study (4S). *Lancet* 344:1383-1389, 1994

# **Obese Diabetic Patients**



#### Management

Use metformin, glitazone or PGR rather than a sulphonylurea or insulin Asses lipids especially triglycerides Exercise gradually increasing program

#### **Dietetic assessment**

Life style clinic referral?

## Pharmacological treatment

#### Orlistat 120mg tds

(2.5Kg loss in 4 weeks prior stop if <5% wt loss in 3 months)

## or Sibutramine 10mg od

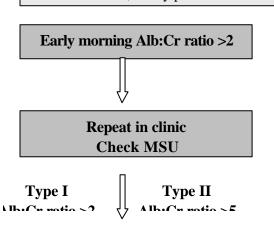
(15mg after 1 month if <2kg loss stop if wt loss <5% in 3 months)

#### **Contra-indication**

Age >65y or <18y; HT>145/90; hepatic or renal impairment, pregnancy/lactation Cardio, cerbro, peripheral vascular disease. Psychiatric, neurological and eating dissorders. Drugs: MAOIs, tricyclics, 5HT uptake inhibitors

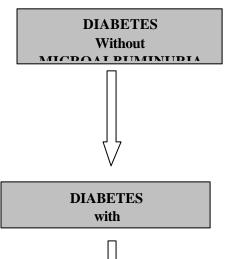
# Proteinuria and Microalbuminuria

Refer all patients with diabetes AND increasing microalbuminuria or proteinuria and/or renal impairment, at least for initial assessment, or any patients in whom the diagnosis of urine or renal abnormalities is unclear



STOP SMOKING REGULAR EXERCISE AVOID WEGHT GAIN Progression of renal failure in diabetes is preventable and requires impeccable BP control and reduction of proteinuria

24hour urine for protein, serum albumin Vicroalbuminuria = 30-300mg/L



ASPIRIN, STATIN if LDL Chol >2.6 MAINTAIN HbA1c < 8% BP < 140/80 mmHg 6 MONTHLY URINE ALBUMIN: CREATININ E RATIO

AIIRA or ACE
INHIBITOR in all
BP < 130/80 mmHg
6 MONTHLY URINE
ALBUMIN: CREATININ
E RATIO
Titrate ACEI/AIIRA to

AIIRA or ACE INHIBITOR in all BP < 125/75 mmHg Ensure under regular

DIABETES
with PROTEINURIA



DIABETES
with RENAL IMPAIRMENT
(creatinine > 150 mcmol/l)

#### **Antihypertensive Therapy**

- Angiotensin receptor
   antagonists (AIIRA) or ACE
   inhibitors should be used in all
   patients with microalbuminuria or
   proteinuria to reduce rate of
   progression to renal impairment, and
   non-renal vascular morbidity
- AIIRA may be better than ACEI
- Monitor serum creatinine after initiation (at 2 weeks) – creatinine will rise in MOST patients – stop ACEI/AIIRA ONLY if creatinine increases >15% above baseline
- Add diuretic (thiazide or indapamide) or calcium channel blockers (use once daily preparations)
- Beta and Alpha blockers useful
- Patients usually need multiple drugs

Jeremy Levy Consultant Nephrologist

## Proteinuria and Microalbuminuria

- Diabetic nephropathy is the leading cause (25-44%) of end-stage renal failure in Europe, the United States and Japan. Microalbuminuria precedes the development of proteinuria and progressive renal impairment. The progression is of microalbuminuria to pesisitant proteinuria and renal disease is highly dependent on blood pressure, glycaemic control and duration of diabetes. In type 1 diabetes there is also a genetic susceptibility to diabetic. The proportion of renal replacement patients with diabetes is expected to double within the next 15 years, due to the increased prevalence of type 2 diabetes, the younger age of onset of diabetes and patient living longer.
- Microalbuminuria is associated with an increased risk of diabetic the other microvascular complications, namely retinopathy and neuropathy, it is also associated with a fourfold increased risk of macrovascular disease: disease in type II DM.
- Primary prevention of diabetic nephropathy is improved glycaemic control and blood pressure lowering. In the
  Diabetes Control and Complication Trial, showed intensified glycaemic therapy in type 1 diabetic patients reduced
  the occurrence of microalbuminuria by 39%, and that of albuminuria by 54%. In the UKPDS the impact of blood
  pressure control was earlier and more dramatic than the effect of glycaemic control on the development and
  progression of microalbuminurea.
- Early ACE inhibition, even when blood pressure is completely normal in type 1 diabetic patients with microalbuminuria can normalise albumin excretion rates and reduce the progression of microalbuminuria to persistant proteinuria.
- Angiotensin II type I receptor antagonists in type 2 hypertensive diabetics indicate that these agents also reduce
  microalbumin excretion rates, an effect that can be further increased with the addition of an ACE inhibitor.

## **Key References**

- EUrodiab Controlled trial of Lisinopril in Insulin dependent Diabetes mellitusThe EUCLID Study Group.
   Randomised placebo-controlled trial of lisinopril in normotensive patients with insulin -dependent diabetes and normoalbuminuria or microalbuminuria. *Lancet*;349:1787-92, 1997
- Brenner BM. Cooper ME. de Zeeuw D. Keane WF. Mitch WE. Parving HH. Remuzzi G. Snapinn SM. Zhang Z. Shahinfar S. RENAAL Study Investigators. Effects of losartan on renal and cardiovascular outcomes in patients with type 2 diabetes and nephropathy. New England Journal of Medicine. 345:861-9, 2001
- Mogensen CE, Neldam S, Tikkanen I, et al. Randomised controlled trial of dual blockade of the renin-angiotensin system in hypertensive microalbuminuric, non-insulin dependent diabetes: the candesartan and lisinopril miroalbuminuria (CALM) study. BMJ. 321(7274):1440-4, 2000

# **Blood Pressure in Renal Replacement**

# Blood pressure in renal; dialysis patients Haemodyalysis aim for <140/90 pre dialysis

Calcium channel blokers can be used daily No ACE or b-blockers or a-blockers on dialysis days

#### Peritoneal Dialysis aim for <140/90 pre dialysis

All antihypertensives may be used

#### **Blood pressure in renal transplant patients**

Calcium channel blokers can interact with (cyclosporin,tacrolimus,rapamicin)
Amlodipine can be used safely however
If use ACE inhibitors reduce diuretcs and check U&E at 1 week >20% rise in K= or creatinine stop ACE

# **Lipids in Renal Replacement**

#### Lipids in renal dialysis patients

Aim for Cholesterol <5 and LDL <3 All current statins may be used Fibrates shoud only be used at low dose (Gemfibrozil) Statin and Fibrate together should not be used unless discuss with renal team

#### Lipids in renal transplant patients

Aim for Cholesterol <5 and LDL <3

Consider interactions with cyclosporin, tacrolimus and rapamicin Use Pravastatin and Fluvastatin (different elimination to cyclosporin) Statin and Fibrate together should not be used

## **Diabetic Retinopathy**

### **Annual Assessment**

Acuity and pinhole acuity
Dilated fundoscopy
Document Cataract formation
Retinopathy

### Times of increased risk

Ensure regular assessment during puberty Assess prior to pregnancy and in 1st trimester Rapid improvement in control (starting insulin)

### Cataracts eye clinic referral

Snow flake urgent referral Senile routine referral

### **Asymmetric disc cupping**

Routine referral to eye clinic

### Nonproliferative diabetic retinopathy

Microaneurysms >5 both eyes or non circinate hard exudates or flame haemorrhages or <5 cotton wool spots Routine referral to eye clinic Optimise HBA1c and BP control Follow up 6/12

Venous beading

### Preproliferative diabetic retinopathy

Haemorrhages
IRMAs
>5 cotton wool spots
Urgent referral to eye clinic
Panretinal photocoagulation?
Optimise HBA1c and BP control
Ensure on ACE inhibitor
Follow up 6/12

### Simple Background

Microaneurysms <5 both eyes Hard exudates away from nacular

If in doubt referral to eye clinic Stress importance of glu control **Else continue annual review** 

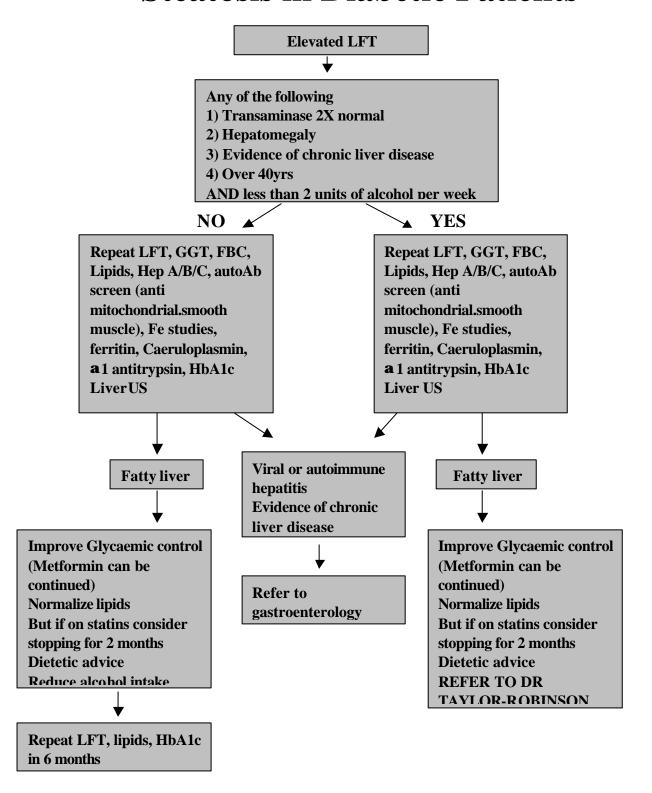
#### Diabetic maculopathy

Change in PH visual acuity
Circinates
Haemorrhages near macular
Urgent referral to eye clinic
Fluroscein angiography?
Focal photocoagulation?
Optimise HBA1c and BP control
Ensure on ACE inhibitor
Follow up 6/12

### **Proliferative diabetic retinopathy**

New vessels at the disc NVD
New vessels elsewhere NVE
Preretinal haemorrhage
Vitreous haemorrhage
New vessels of iris NVI
Urgent referral to eye clinic
Fluroescein angiography?
Laser photocoagulation?
Optimise HBA1c and BP control
Ensure on ACE inhibitor
Follow up 6/12

### **Steatosis in Diabetic Patients**



### **Peripheral Neuropathy**

### History

Paraesthesia, hyperasthesia, allodynia Numbness and contact sensitivity Burning pain in feet, worse at night, Poor sleep and restless legs (May be precipitated by poor control or rapid improvement in control)



#### Examination

Evidence of motor/sensory/autonomic neuropathy? Ascent reflexes, anhydrosis
Warm hairless legs frequently with strong pulses Glove stocking neuropathy Reduced LT, PP, VS, JPS and Temp sensation Assess10g microfilament sensation



**Investigations**HBA1c, U&E, LFTs, Igs and PEP FBC, ESR and B12, Intrinsic factor ab Syphilis serology Consider Nerve Conduction Studies?



### **Initial Management**

Educate about foot problems Formal podiatry assessment Doppler studies if no palpable pulse Regular 3/12 chiropody

### Mild Symptoms



### **▲**Severe Symptoms

#### Management

Optimise glycaemic control HBA1c < 7.5 Simple advice tights under cloths Simple analgesia (aspirin/paracetamol/coproximol)

#### Reassurance

Severe pain usually improves in <2y Regular 6/12 follow up in diabetic clinic Optimise glucose control (HBA1c <7.5%) Low threshold to switch to insulin

### **Physical methods**

Bed cradle (to remove covers from feet) Semipermeable plastic foot wrap (Opsite) **TENS** 

### **Pharmacological**

Gabapentin (300mg od, 300mg bd, 300mg tds increase to maximum of 600mg tds) Amitriptyline (25mg nocte to 100mg) Carbemazepine (100mg od to 600-800mg/d) Capsaicin (4x/day releases substance P)

**Referral to Professor Anand Hammersmith** 

## **Diabetic Amyotrophy**

### **History**

Motor Neuropathy (lumber-sacral plexus) Frequently male, Type II DM, 50-60y, Gradual onset

Thigh weakness, severe pain and wt loss Anorexic



### **Investigations**

U&E, Calcium, LFTs, CRP

FBC, ESR

HBA1c

**PSA** 

Xray Chest, Thoracolumber spine

**Nerve Conduction Studies** 



### Management

Admit to hospital

Swith to qds insulin

Dietetic assessment

Optimise HbA1c

Analgesia (may need opiates, tricyclics)

Physiotherapy

IV steroids used in trials



Expect gradual improvement over 3/12

## **Autonomic Neuropathy**

Parasympathetic more than sympathetic Peripheral neuropathy also frequently present

### History

Postural Hypotesion Gustatory sweating, peripheral anhydrosis Anorexia, bloating, nausea, vomiting Constipation and nocturnal diarrhoea Erectile dysfunction Overflow incontinence, dribbling UTIs

Recurrent hypoglycaemic poor awareness

#### Examination

Resting tachycardia (>100bpm) Postural hypotesion after 2 minutes (>30mmHg systolic or >10mmHg diastolic)

### **Postural Hypotension Investigations**

**Autonomic Function Tests** (ECG recording monitor) Valsalva ratio (shortest RR during/longest RR after)

ratio>=1.21 normal : ratio <=1.20 abnormal

### Postural BP after 2 minutes standing

>30mmHg Systolic or >10mmHg Diastolic abnormal **Hand grip** ( sustained 30% max grip for 5 minutes) (diastolic BP measured before and just before end) <=10mmHg rise is abnormal

24h BP monitoring

#### **Gastroparesis**

#### Investigations

Gastric emptying studies (Nuclear medicine) Endoscopy

#### Management

Dietetic assessment

**Domperidone** 10-20mg tds

**or Metoclopramide** 5-10mg before meals

or Erythromycin 250mg tds - qds (Octreotide in resistant cases?)

If severe referral to gastroenterology

### **Postural Hypotension**

**If mild:** avoid diuretics, vasodilators, tricyclic compression stockings

If severe refer to Professor C. Mathias (St Mary's)

Discuss treatment with consultant

Fludrocortisone 50mcg (monitor BP, U&E, osmo)

**DDAVP** 10mcg nocte (monitor BP, U&E, osmo)

Midodrin (peripheral α<sub>1</sub>-agonist named patient only) quite effective (5-10mg before breakfast and lunch) (Erythropoetin/Octreotide in resistant cases)

### **Nocturnal Diarrhoea/Incontinence**

### Investigations

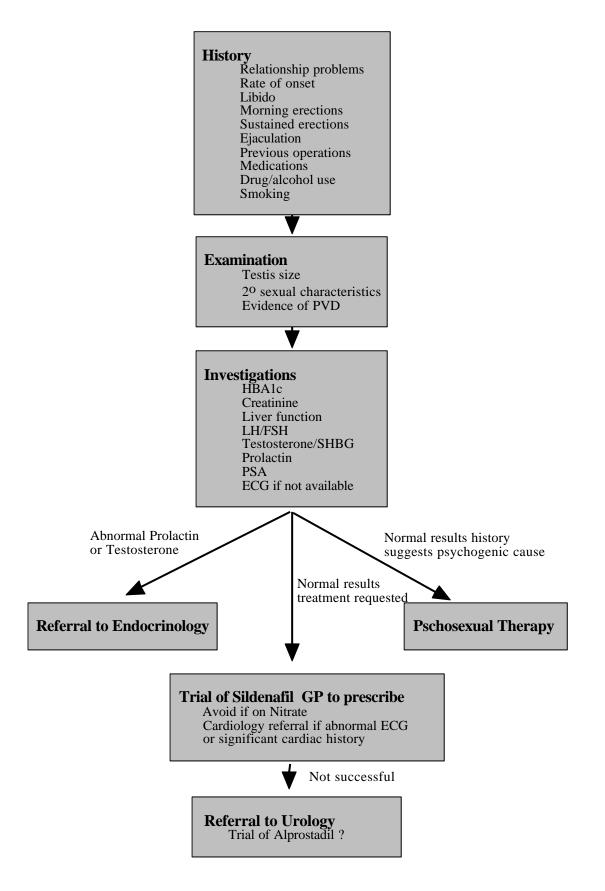
Stool culture microscopy Anti endomesial/gliadin ab Colonoscopy

#### Management

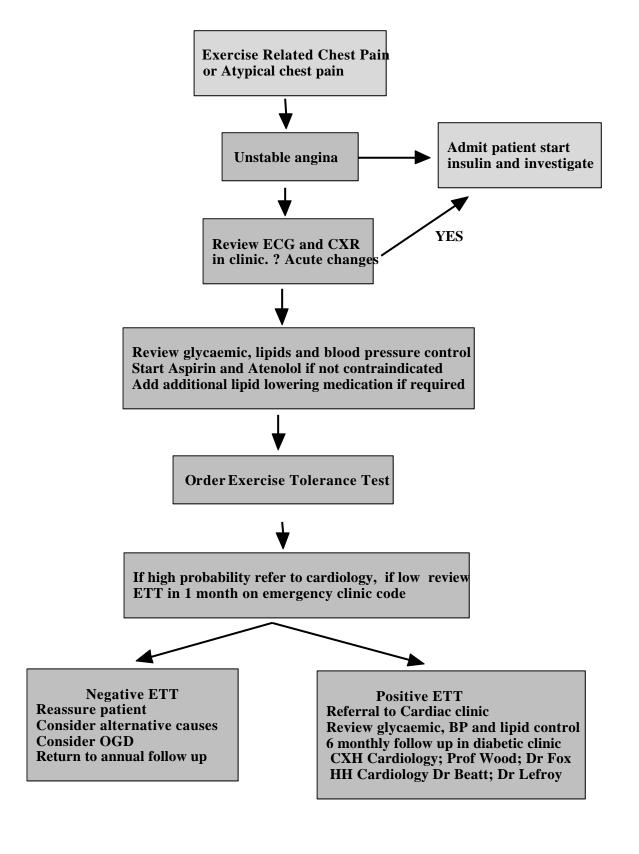
**Stop Metformin** 

**Erythromycin** 250mg qds 1week **Codeine phosphate** 30mg qds If severe referral to gastroenterology

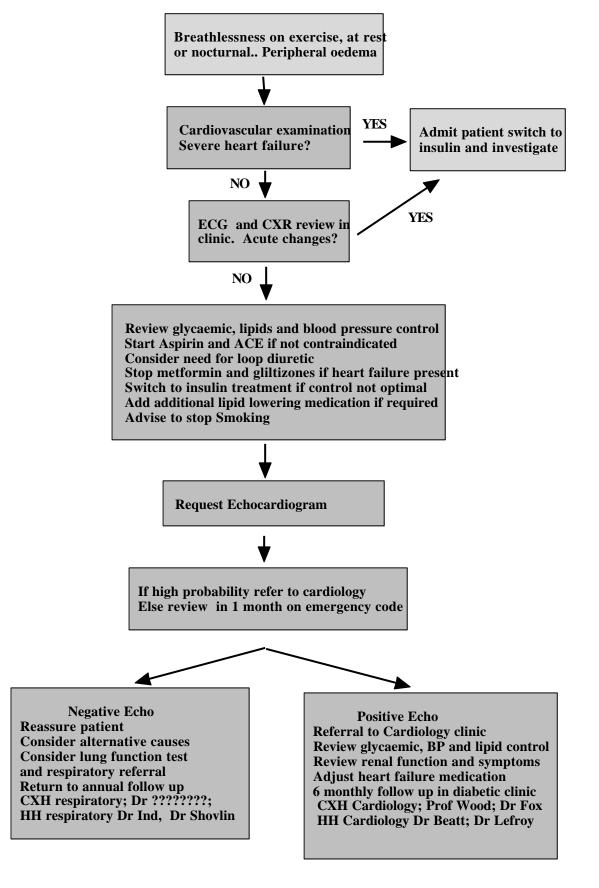
## **Erectile Dysfunction**



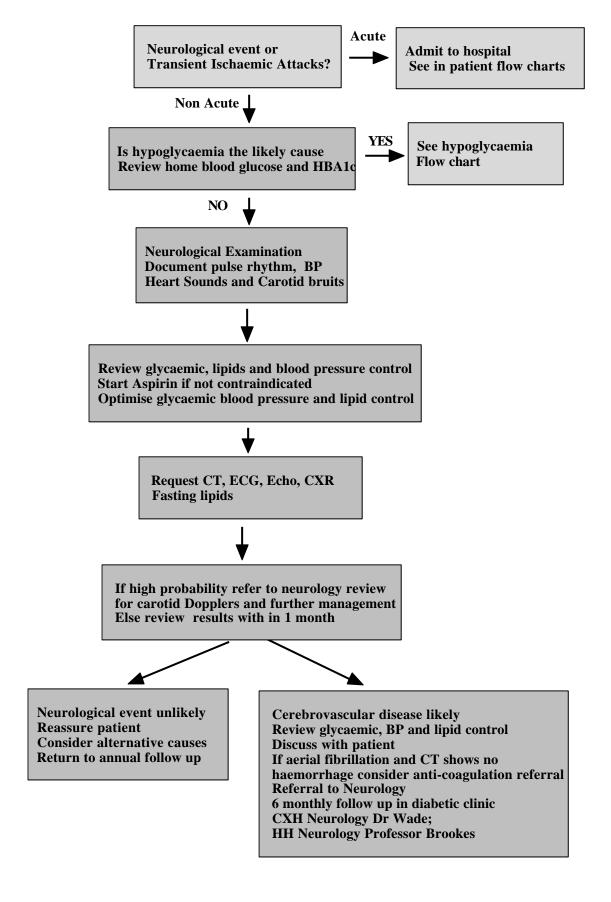
### **Coronary Heart Disease**



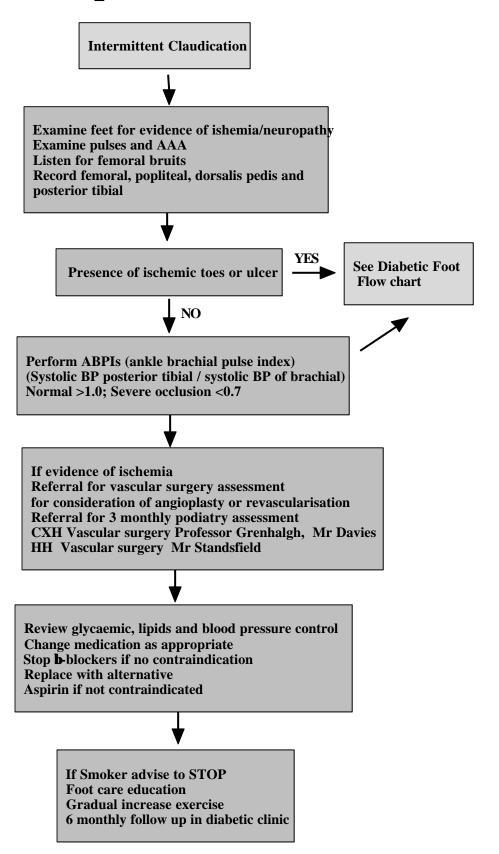
### **Heart Failure**



### Cerebrovascular Disease



### Peripheral Vascular Disease



## **Diabetic Foot Assessment**

	Right		Left					
Pulses	Palpable		Weak	Absent	Palpable	Weal	<	Absent
D Pedis								
Posterior Tibial								
ABPI D pedis								
Post Tibial								
Cap. Filling time				sec				St
Colour	Cyanosed		Normal	Erythema	Cyanosed	Norma	al	Erythem
Toes								
Foot								
Temperature								
Toes								
Foot								
Vascular Signs &								
Symptoms	Present			Absent	Present		Absent	
Intermittent Claudication								
Rest Pain								
Oedema								
Neurological	Presei	nt		Absent	Preser	nt	Al	bsent
Pin prick								
10gNeurofilament								
Vibration perception								
Hallux								
Malleoli		1						
Reflexes	Present	Re	educed	Absent	Present	Reduce	d /	Absent
Knee								
Ankle						l		_
Footwear	Suitable		Un	suitable	Specialist	Э	rthotic	
CLASSIFICATION	R	L			_	R	L	
Stage One : Normal foot				Stage Four: In	fection/ Necro	osis		
Stage Two : High Risk				Stage Five : A	mputation			
Stage Three : Ulceration								
Neuropathic				Neuroischaem	nic			

Clinicians name:	Date for review:

### **Diabetic Foot**

#### **Risk Factors**

Previous Ulcer, Poor Foot care, deformity Retinopathy

Peripheral neuropathy (10g microfilament) Autonomic neuropathy

Nephropathy Elderly

### History

May be no history of pain, swelling warmth Trauma or new footwear

#### **Examination**

Document site and description of cellulitis/ulcer/deformity Reflexes, LT, VS, PP, JPS, 10g micofillament

Pulses femoral, popliteal, DP and PT pathic ulcer: Warm clean punched out at pressure points Neuropathic ulcer: Warm clean punched out at pressure point Neuroischemic ulcer: Cold pulseless foot, gangrenous heal/toes Probe full depth of ulcer, if to bone then assume osteomyelitis Always consider the possibility of Charcot Joints

#### Investigations

U&E, CRP, HBA1c

FBC, ESR

Ulcer Swab (probe full depth of ulcer)

Foot X-ray

Bone scan if suspect OM/Charcot

**ABPI** (Ankle-brachial pressure index)

(systolic BP at post tibial/ systolic BP at brachial) Normal >1.0 <0.7 significant occlusion

### Minor superficial infection

### **Severe infection**

### Management

Optimise glycaemic control Podiatry review (today and weekly)

Weekly foot swabs

Foot care education

Footwear assessment

Start oral antibiotics

Amoxycillin 500mg tds Flucloxacillin 50mg qds Metrnidazole 400 mg tds

Or Augmentin 625mg tds

Penicillin allergic

Ciprofloxacin 500mg bd

Regular U+E, FBC, CRP, LFT Regular chiropody review when recovered

### No Improvement after 1 week

### Management

Podiatry review TODAY Admit patient Start insulin (basal bolus) Start iv antibiotics

Penicillin G1.2g tds Flucloxacillin 500mg qds Metronidazole 400mg tds

Osteomyelitis suspected

Ciprofloxacin 500mg bd Clindamycin 300mg qds

Vascular surgical opinion Tissue viability nurse assessment Education regarding foot care Footwear assessment

Regular U&E, FBC, CRP, LFT Regular chiropody 3/12 when normal

### **Charcot Joint**

### **History**

Acute onset unilateral erythema, oedema and warmth

Pain may or may not be present

history of mild trauma

Early diagnosis and treatment is essential

Charcots usually involves midfoot

Osteomyellitis usually proceeded by an ulcer and affects

metatarsal/calcaneum

Differential diagnosis

Cellulitis, Osteomyelitis, DVT, Gout



#### **Examination**

Document site and description of cellulitis/ulcer/deformity Reflexes, LT, VS, PP, JPS, 10g micofillament Pulses femoral, popliteal, DP and PT

Document lying and standing BP



### **Investigations**

U&E, AlkP, CRP, Urate, HBA1c FBC, ESR

Foot X-ray

Bone scan and then White Cell Scan



### Management

Podiatry review TODAY

Admit patient

Antibiotics if osteomyelitis is possible continue till excluded

Optimise glycaemic control

Radiology review +/- MRI scan

Orthopaedic surgery review

Immobilisation non wt bearing cast for 1 month

Then total contact cast or aircast with very gradual mobilisation

Regular CRP and AlkP

### Pharmacological

Bisphosphonates may help :

(? Pamidronate 90mg iv, or oral bisphosphonates)

#### Follow up

Footwear assessment moulded inserts etc

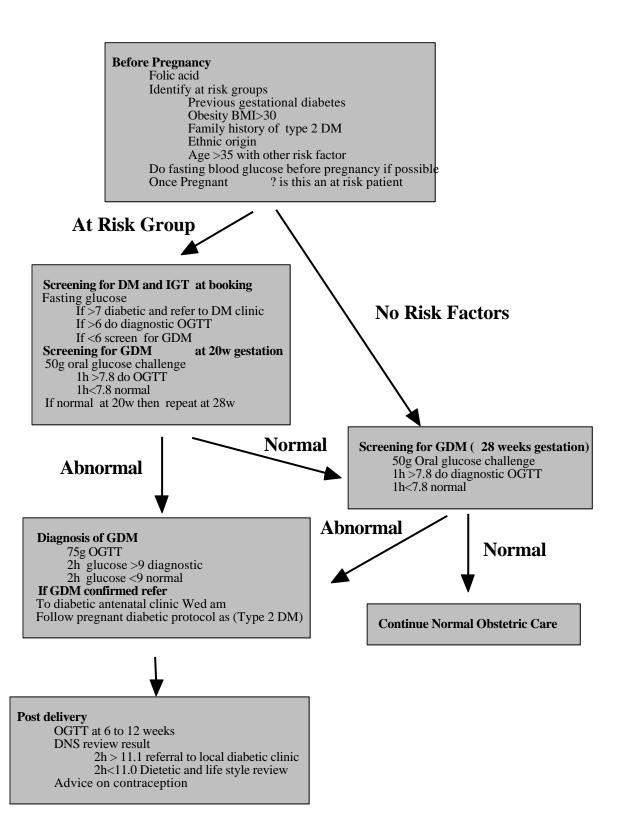
Regular podiatry 3/12 when discharged

Orthopaedic surgery follow up

### **Pregnancy in Known Diabetics**

### **Before Pregnancy** Contraception advise Review of complications Dilated fundoscopy Advice on importance of planning for pregnancy Need for DM 5mg OD folate Ensure has home pregnancy testing kit Type 2 DM Type 1 DM Optimised control (HbAic <7.5%) Optimised control (HbAic <7.5%) If on oral medication start BD insulin If on BD regime change to QDS Suggest Mixtard 30 / M3 Sum total BD insulin 15U am and 10U pm Short acting 20% (total) TDS Stop all oral hypoglycaemics Longacting 20% (total) nocte At first missed period Confirm with pregnancy test (repeat 1 wk. if neg) **Confirmed pregnancy** Notify DNS at Hammersmith Hospital and GP Seen within 7 days in joint diabetic antenatal clinic Wed am Dating / viability scan Dilated fundoscopy in each trimester Dietetic review Diabetic Follow Up 2-4 wkly joint diabetic antenatal clinic Wed am 4-6 x daily home glucose monitoring Target Fasting and before meals <5.5 1 hr post meal < 8 DNS telephone monitoring of glycaemic control Dilated fundoscopy in each trimester **Post Partum** Reduce insulin dose by 50% immediately after delivery Arrange diabetic clinic appointment within 3/12 Advice re contraception Type 2 DM may restart oral therapy after breast feeding

### **Gestational Diabetics**



### **Diabetic Ketoacidosis**

( See also Hammersmith Hospitals Guidelines )

#### DIABETIC KETOACIDOSIS OCCURS IN TYPE I DM

Presentation (Usually young and thin)
Dehydration, tachypnoea, tachycardia, ketosis, ketonuria, Vomiting, abdo pain, drowsiness and confusion

Urinary ketones •2+, bicarbonate Š15mmol/l, pH <7.35 **Precipitating factors** 

New diagnosis type I, Infection, missed insulin, steroids MI, CVA, trauma, hyperthyroidism, pheochromocytoma Complications

Cerebral oedema, RDS, thromboembolism, mortality <4%

#### AIM TO CORRECT ACIDOSIS WITH INSULIN AND IV FLUID AND RESTORE ELECTROLYTE BALANCE REGARDLESS OF GLUCOSE

#### **Initial Investigations**

Finger prick blood glucose (record in notes)
Urine dipstick (record level of ketones in notes)
FBC, U&E, Bicarbonate, Osmolality, Amylase
Glucose, CK, Blood Gas
Blood cultures X2 and Urine culture ECG, CXR

?Pregnancy test, CT LP (if suspect meningitis)

#### **Initial Management**

al Management
ECG monitor, Oxygen if pO2<10.5kPa
Urinary Catheter (If elderly, impaired consciousness, no urine in 1h)
CVP line(If very unwell, BP<90, pH<7.0, Cardiovascular disease, or >65y)
NG tubeif impaired consciousness or vomiting (aspirate hourly)
Consider ITU(impaired consciousness, severe hypotension, pH <7.0)
Bicarbonate if pH <7.0 consider 100ml of 1.26% NaHCO3 (CVP) hourly until pH>7.0
Give 10-30mmolKCl in separate infusion
IV fluids(average deficit 4-6l; postural BP or CVP)
BM>12 give 0.9% saline (usually at least first 4-51)
BM<12 give and pH<7.3 give 10% glucose
Volume (1.5l in 1h; 1l in 1h; 1l in 2hl in 4h; 1l in 4h; 1l in 8h)
KCl sunplements

**KCl** supplements

Add KCl from the second litreof fluid (Stop if K>6 or anuric) KCl (K<3 40mmol/h; K3-4 30mmol/k4-5 20mmol/l; K5-6 10mmol/h)

Insulin
Give Actrapid 20u SC stat; If dehydrated give 10u IV stat in addition Give Actrapid 20u SC stat; if dehydrated give 10u IV stat in addit Put 50u actrapid in 50ml 0.9% saline in syringe pump Give at 6ml/h until pH>7.3 (Start 10% glucose if BM<12) When pH >7.3 use 5% glucose if BM<12, 0.9% saline if BM>12 Use scale (BM 0-5 1u/h; BM 5-12 3u/h; BM>12 4u/h) Do not stop insulin if glucose low give IV glucose Heparin 5000u 8h sc

Antibiotic if evidence of infections



Temp, P, BP, JVP (postural BP) GCS Urine output and ketones; BM hourly, (>20 do glucose) K+, pH and Bicarb 2-4hourly all on blood gas A venous sample (blood gas syringe) once pH >7.2 is OK



#### Continued Management

Contact endocrine registrar, diabetic nurse specialist and dietitian If no ketones and patient can eat and drink convert to s/c insulin May need 10-20% higher than normal dose (acidotic resistance) give sc insulin before meal, 1h after meal stop iv insulin

### **Hyperosmolar Non-Ketotic State**

(See also Hammersmith Hospitals Guidelines)

#### THE HYPEROSMOLAR NON-KETOTIC STATE OCCURS IN TYPE II DM

Presentation (Usually in elderly and obese patients)

Severe dehydration, renal impairment, tachycardia, vomiting, drowsiness and confusion

Osmolality>320 (280-300) Osmo=(2(Na+K)+Urea+Glu, Urinary ketones -ve (may be 1+); Glucose 40 to 100mmol/l Bicarbonate >16mmol/l

#### Precipitating factors

New type II DM, Xs sugary drinks, Infection, steroids, MI, CVA

Arterial and venous thromboembolism, mortality <20-30% Cerebral oedema, central pontine myelinolysis

#### AIM TO SLOWLY CORRECT THE HIGH OSMOLOLITY NOT JUST THE GLUCOSE WITH INSULIN AND IV FLUID

Lower by no more than 5mOsm/Kg per hour



#### **Initial Investigations**

Finger prick blood glucose (record in notes) Urine dipstick (record level of ketones in notes)
FBC, U&E, Bicarbonate, Osmolality, Amylase
Glucose, Lipids, CK, Blood Gas
Blood cultures X2 and Urine culture ECG, CXR CT LP (if suspect meningitis)

Note psuedohyponatraemia (Due to Glu and Tgs) (3mmol rise in Glu give artificially lower Na by 1mmol)



ECG monitor, Oxygen if pO2<10.5kPa, Urinary Catheter
CVP line (If very unwell, BP<90, Cardiovascular disease, Raised JVP or >65y)
NG tube if impaired consciousness or vomiting (aspirate hourly)
Consider ITU (impaired consciousness, severe hypotension)
IV fluids (average deficit 9); postural BP or CVP)

BM>12 give 0.9% saline (usually at least first 4-51)
BM<12 give 0.9% saline (usually at least first 4-51)
BM<12 give give 5% glucose
Volume (11 in 2h; 11 in 4h; 11 in 8h
Give 0.45% saline only of Na>160mmol/1
KCl supplements (need less than DKA also special care with renal failure)
Add KCl from the second litre of fluid (Stop if K>6 or anuric)
KCl (K<3 40mmol/bag; K3-4 30mmol/bag; K4-5 20mmol/bag; K5-6 10mmol/bag)

Give Actrapid 10u IM stat; If dehydrated give 10u IV stat
Put 50u actrapid in 50ml 0.9% saline in syringe pump
Use scale (BM 0-5 0u/h; BM 5-7 1u/h; BM 7-12 2u/h; BM >12 3u/h)
Do not use more than 3u/h aim to reduce osmolality by 5mOsm/Kg per hour

Heparin 5000u 8h sc but consider formal anticoagulation

Antibiotic if evidence of infections



#### Monitor

Temp, P, BP, JVP, GCS Urine output; BM hourly, (>20 do glucose) U&E at least 2h and record osmolality Keep accurate fluid balance



#### Continued Management

Contact endocrine registrar, diabetic nurse specialist and dietitiar Recovery may take 2 to 3 weeks

Likely to require oral hypoglycaemics or diet at discharge

### **Acute Hypoglycaemia**

ACUTE HYPOGLYCAEMIC EPISODE Blood Glucose <3mmol/l

### Presentation

Sweating, Hunger, Agitation, Aggression, Confusion, Fitting, Focal neurology or Coma.

Differential Diagnosis

Known diabetic look for bracelet or card

Excessive insulin, sulphonylures, exercise or alcohol Missed meals, Medication change (Steroids, ACE) Malabsorbtion, renal failure, pregnancy,

Liver failure

Adrenal insufficiency

Hypopituitarism

Insulinoma

Factitious (Insulin, sulphonylurea)

**Investigations** 

If not known diabetic

U&E, Liver function, Glucose

Cortisol, TFT, LH/FSH, PRL

Saved clotted spun/frozen for Insulin/C-peptide

Urine sample for sulphonylurea

If diabetic

U&E, Liver function, Glucose, HBA1c, TFT anti endomesial, anti gliadin antibodies, B12, Folate

consider pregnancy test and cortisol

**Initial Management** 

Confused or agitated patients if no IV line available

1mg Glucagon IM or oral glucose gel Hypostop

Confused or agitated patient with IV line

Give 25-50ml 50% glucose in fast running 5% glucose drip until OK Give 25g of glucose orally and continue 5% glucose IV (11 in 4h)

Unconfused patient

Give 25g in orange juice or milk or 4 sugar cubes in water

**Continued Management** 

Overdose of insulin or sulphonylurea

Admit all patients maintain of 5% glucose IV until alert then feed 4 hourly

Admit if long acting sulphonylurea ie: glibenclamide

Patients with complete recovery

Give small meal and document normal blood glucose

discharge home if safe environment and no other complications

Patients without complete recovery

Admit patient continue IV 5 or 10% glucose (11 every 4-6h) until normal

BM s recorded hourly

Contact diabetic nurse specialist about all diabetic patients

See also hypoglycaemia in diabetics protocol (Driving and DVLC etc)

### **Diabetics and MI (DIGAMI Protocol)**

### MYOCARDIAL INFARCTION IN DIABETICS



Diabetics and patients admitted with a Glu>11 Treated for 24h by IV insulin/Glucose and Then 3/12 qds basal bolus insulin REDUCED 3Y MORTALITY BY 11%



Manage as per Myocardial Infarction except Check formal Lab Glucose at admission HBA1c (exclude stress hyperglycaemia) STOP all oral hypoglycaemics Check for proliferative retinopathy or haemorrhage before thrombolysis



### INSULIN/GLUCOSE INFUSION

Place 80u Actrapid insulin in 500ml of 5% glucose ( 1u/6ml ) Start at 30ml/h check BM at 1h

BM >15 Give 8u Actrapid IV increase rate by 6ml/h

BM 11-15 Increase infusion by 3ml/h

BM 7-11 No change in infusion rate

BM 4-7 Decrease infusion by 6ml/h

BM <4 Stop infusion 15 min retest every 15 min till BM 7

If rate changed check BMs after 1 h

If BM>11 and decrease >30% no change

If BM 7-11 and decrease >30% reduce by 6ml/hr

Then check BMs 2h

After 10pm if glucose stable and Š11 reduce rate by 50% over night



#### S/C INSULIN

After minimum of 24h convert s/c insulin

If previously well controlled on bd insulin and HBA1c <7.5 restart this

Else Actrapid 4u tds: Insulatard 6u

Contact Endocrine Registrar, diabetic nurse specialist and Dietitian

### **Surgical Patients with Diabetes**

#### DIABETIC PATIENTS ADMITTED FOR SURGERY

On average Diabetic patients stay in hospital 3 times as long Diabetics should be admitted at least 24h prior to surgery BMs should be measured before each meal and bedtime BMs should be measured hourly if on sliding scale SICK PATIENTS MUST NOT BE ON METFORMIN ALWAYS INFORM THE DIABETIC TEAM

#### DIET TREATED TYPE II DM

If BMs <10 for 24h manage as non-diabetic except BMs 2-4h for 24h post op If BM consistently >10 post op start sliding scale and do BMs hourly and seek advise When eating and drinking 6h BMs If BMs consistently >10 when eating seek advise

### TYPE II DM on ORAL HYPOGLYCAEMICS

RISK of hypo and hyperglycaemia
No oral hypoglycaemics on day of surgery
Start insulin sliding scale and 5% glucose IV at 8am
(or 2h before theatre whichever is earlier) do BMs hourly
Continue till eating and drinking and no complications
Then restart oral medication and 6 hourly BMs
If complications seek advise as may need short term insulations.

#### INSULIN TREATED TYPE I or II DM

Reduce evening insulin day before surgery 20% for a twice daily regeme

50% of the long acting insulin in QDS regime
Ensure bed time snack to avoid morning hypoglycamia
Start insulin sliding scale and 5% glucose IV at 8am
(or 2h before theatre whichever is earlier) do BMs hourly
Continue till eating and drinking and no complications
If minor surgery restart normal regime do 4-6h BMs
If major surgery will need a qds basal bolus regime initially
Seek advise and do 4-6h BMs
Never discontinue glucose/insulin infusion until 1h after first s/c insulin



#### INSULIN/GLUCOSE INFUSION

In previously fit adult

 $Alternating \ (\ 0.9\% \ saline \ 11\ )/(\ 0.5\% \ Glucose \ 11 + 20mmol/KCl\ ) \\ Sliding Scale \ (Target \ glu \ 5-10mmol/l)$ 

Source (Target gut 3-10minol/1)
50u Actrapid in 50ml 0.9% Saline (flush 10ml through line)
Glucose (mmol/1):5 5--7 7-10 10-15 15-20 >20
Insulin (u/h) 0.5 1 2 3 4 5

If after 4h Glu not<11mmol/l

Insulin (u/h) 1 2 3 4 5 6
If Glucose persistently <5mmol/l change to 10% Glucose IV
If Hypoglycaemic with Glu<3.5 and confused or NBM

Give 20ml 50% glucose via fast flowing 5% glucose line IV If eating give oral glucose and repeat BM

### **Incidental Diabetic Diagnosis**

#### INCIDENTAL DIAGNOSIS OF DIABETES IN CASUALTY

Polyuria, polydipsia, blurred vision, weight loss, cutaneous sepsis, **Diagnosis** 

Random glucose ·11.1



**Examination must document** Blood pressure lying and standing Peripheral pulses Lower limb reflexes, peripheral sensation **Examination of feet for infection, ulcers, Charcots** Visual acuity and fundoscopy



**Initial Investigations** Finger prick blood glucose (record in notes) **Urine dipstick (record level of ketones in notes)** FBC, U&E, LFTs, Lipids, HBA1c, TFTs, Glucose Bicarbonate, Osmolality, Amylase, Blood Gas Consider ECG, CXR



### **Patient Admission**

Admission is necessary if

Not eating and drinking normally

Nausea or Vomiting

Ketoacidosis (pH <7.35)

Other complicating problems

Admission is not necessary if

Patient is otherwise well, no sepsis/ulcers Eating and drinking normally



### **Further Management**

### Type I DM

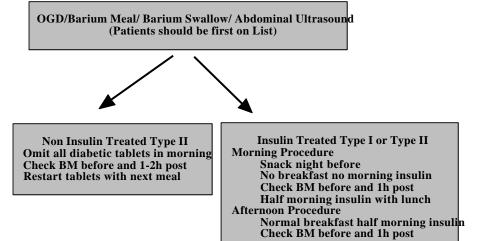
Patients will need to see the diabetic nurse specialist to start insulin on that day or at next possible opportunity in working hours Referral to diabetic consultant for out patient clinic

#### Type II DM

Patients can be seen routinely but contact diabetic nurse specialists If osmotic symptoms consider starting Gliclazide 80mg od If no osmotic symptoms, obese, normal renal/liver function consider commencing metformin 500mg bd

Letter to GP patient to see GP within 2 days Explain diagnosis and give dietary advise regarding sugar and sugary drinks To return to A&E if unwell or not eating or drinking

### **Diabetics and Out Patient Procedures**



Barium Enema/Colonoscopy (Patients should be first on List

Non Insulin Treated Type II Omit all diabetic tablets day before procedure Fasting and Prep as X-ray protocol Omit all diabetic tablets in morning Check BM before and 1-2h post Restart tablets with next meal

Insulin Treated Type I or Type II If complications or elderly or acromegly admit patient day before procedure sliding scale during preparation

Normal evening insulin

If no complications

Day before procedure
Take 2/3 normal morning insulin and light breakfast Fasting and Prep as X-ray protocol Measure BMs 4 hourly Take 1/2 normal evening dose of insulin

Have clear soup and fruit juice or small amount lucoza If BMs <5 or feel hypo have clear fruit juice or lucozad Check BM before bed

Day of procedure

Check BM on waking

After procedure give normal morning dose with lunch Normal evening insulin

### **METFORMIN AND IV CONTRAST**

The following protocol is used by the radiology departments at Hammersmith and Charing Cross Hospitals.

### Protocol for diabetic patients on Metformin having IV contrast.

- 1) The patient should be given the information sheet when the investigation is booked. Details of the requesting doctor and their contact number should be added to the sheet.
- 2) An information sheet should be sent to the doctor requesting the investigation.
- 3) The patient should not take metformin on the day of the contrast examination. Alternative medication does not need to be prescribed.
- 4) Before leaving the department the patient should be given a completed U+E form and told to have the blood taken 48 hours later (either in the hospital or by the GP). They will also be given the name and contact number of the doctor who requested the investigation.
- 5) The day after the blood test, the patient should contact the doctor who has ordered the investigation.

  The doctor will advise them whether or not metformin can be restarted. (Metformin should not be restarted unless the creatinine is less than 150).

### Information for diabetic patients on Metformin having IV contrast medium

Dear patient

You have been given an appointment to have an investigation which uses an injection of 'contrast medium'. Very occasionally, contrast medium with metformin can result in illness. In order to prevent this, you must follow the guidelines below;

- 1) Do not take your metformin on the day of the contrast test. You do **not** need to have a different medicine whilst the metformin is stopped.
- 2) Before you leave the X-ray department, please make sure you have a blood test form and the name and contact number of the doctor who requested your test.
- 3) 48 hours after your contrast test, you must have the blood test requested (either in the hospital, at clinic 6+7 on the 1<sup>st</sup> floor or from your GP).
- 4) The day after the blood test is taken, you must ring the doctor below who requested the test. They will tell you if you can restart the metformin.

The doctor to contact is	 	 
Their contact number is		

Information for doctor	rs requesting investigations	with IV contrast medium	n in diabetic patients on
Metformin			

**Dear Doctor** 

RE:

You have requested an investigation involving the use of IV contrast medium on a patient taking metformin.

There are case reports of lactic acidosis in patients on metformin due to renal impairment following IV contrast.

Therefore your patient has been given the following information

- The patient should not take metformin on the day of the contrast examination. Alternative medication does not need to be prescribed.
- 2) Before leaving the X-ray department the patient will be given a completed U+E form and told to have the blood taken 48 hours later (either in the hospital or by the GP). They will also be given the name and contact number of the doctor who requested the investigation.
- 3) The day after the blood test, **the patient should contact the doctor who has ordered the investigation.** The doctor will advise them whether or not metformin can be restarted.

Your patient will contact <u>you</u> 24 hours after their renal function has been checked for advice on whether or not to restart metformin.

Metformin should not be restarted unless the creatinine is less than 150.

## **Guidelines for Diabetic Patients**

## **Assessment and Follow Up**

HAMMERSMITH HOSPITAL	TELEPHONE
<b>Diabetic Nurse Specialists</b>	020 8383 4693
Dieticians	020 8383 3048
Podiatry	020 8383 4616
<b>Diabetes Appointments</b>	020 8383 5000
<b>Diabetes Secretaries</b>	020 8383 4828
24h Emergency Advice	020 8383 1000
(Ask for Endocrine Registrar)	

CHARING CROSS HOSPITAL	TELEPHONE
<b>Diabetic Nurse Specialists</b>	020 8846 1062
Dieticians	020 8846 1445
Podiatry	020 8846 1621
<b>Diabetes Appointments</b>	020 8383 5000
<b>Diabetes Secretaries</b>	020 8383 1065
24h Emergency Advice	020 8383 1000

(Ask for Endocrine Registrar)

**Diabetes UK** Tel 020 7323 1531 www.diabetes.org.uk

## The Initial Diagnosis of Diabetes

### SYMPTOMS AT DIAGNOSIS MAY INCLUDE

Thirst
Frequent passing of urine
Weight loss
Blurred Vision
Recurrent infections

### **DIAGNOSIS OF DIABETES**

Must be made in one of 3 ways

- 1) A random blood sugar greater than 11
- 2) 2 fasting blood sugars greater than 7
- 3) A blood sugar of >11, 2 hours after drinking75g of sugar in water

### **DIABETES MELLITUS**

Insulin is the important hormone in sugar (Glucose) control Diabetes is a failure of the body to control its sugar correctly There are 2 ways this can happen and so 2 types of diabetes

### **Type I diabetes**

Caused by destruction of the cells that make insulin in the pancreas There is therefore a total lack of insulin Usually occurs under the age of 30 years Always requiring insulin treatment

### Type II diabetes

Caused by an increased resistance to the effects of insulin
Usually occurring over 30 years of age
Can usually initially be treated by diet or tablets but may require insulin later
Diet, weight loss and exercise increase sensitivity to insulin and may therefore
reduce the amount of treatment required

### **Complication of Diabetes**

### PROBLEMS ASSOCIATED WITH DIABETES

The associated problems or complications of diabetes may be present at the time of diagnosis or may occur at any time after the diagnosis

The reason for careful follow up of diabetic patients is to significantly reduce the chance of these problems occurring.

The complications of diabetes are due to the long term damage of the large and small blood vessels in the body due to the effects of a high blood sugar, blood pressure and cholesterol.

### DAMAGE TO LARGE BLOOD VESSELS INCREASED RISK OF

Heart attaches due to poor blood supply to the heart Strokes due to poor blood supply to the brain Calf pain on walking due to poor blood supply to the legs Foot infections that may lead to amputation

### DAMAGE TO SMALL BLOOD VESSELS INCREASED RISK OF

Damage to the eye that may result in poor vision or blindness Damage to the kidney that may result in kidney failure and dialysis Damage to nerves that may result in numbness or pain, damage to the feet and ankles and problems with erections in men.

### THE FOLLOWING REDUCE THE CHANCES OF THESE COMPLICATION

Not Smoking

Good control of blood sugar levels (HbA1c <7.5%) Good control of blood pressure <140/80

Good control of cholesterol Cholesterol/HDL <5.0 Normal body weight Body Mass Index <30

Healthy life style (Diet and exercise) At least 30 minutes exercise 3 times a week

Good foot care

### Please ask your Doctor about your results each time you are seen

### **New Diabetic Outpatient Assessment**

### ATTENDING APPOINTMENTS

It is essential that you attend all you appointments with the members of the diabetic team. If you fail to attend an appointment and have not cancel it in advance with appointments department you will be discharged from the clinic.

### NEW REFERRAL RECEIVED AND REVIEWED BY CONSULTANT

Priority decided by consultant

Nurse and dietician clinic appointment booked

Medical outpatient appointment booked

(Diabetic diagnosis confirmed if not stated in referral)

### NEW PATIENT DIETICIAN CLINIC

Dietary history and advise on diabetic diet Advise on low fat and weight loss diets as appropriate Life style advise

### NEW PATIENT DIABETIC NURSE SPECIALIST CLINIC

Initial assessment and history

Education about Diabetes and life style advise

Initial treatment decided (diet or tablets or insulin)

Initial treatment started

Blood tests performed

Full blood count

Kidney function, Liver function, Lipid Profile, Thyroid function

Glucose and HBA1c (long term sugar control measurement)

Initial urine tests

ECG in type II diabetics

Follow up appointment made if necessary

### NEW PATIENT MEDICAL OUTPATIENT CLINIC

Medical history

Physical examination

Assessment of home glucose monitoring

Assessment of blood test results (Organise further tests if required)

Further diabetic education

Adjustment of medication for diabetes

If needed start medication for high blood pressure and high cholesterol

If needed referral to other specialists

Decide on Hospital or GP follow up

### Follow up for diabetic patients

### CONTINUED HOSPITAL OUT PATIENT FOLLOW UP

Diabetics treated with Insulin

Diabetics with complications affecting their

Eyes (Retinopathy)

Kidneys (Nephropathy)

Nerves (Neuropathy)

Heart

Feet

Diabetics with poorly controlled

Sugar

Blood pressure

Cholesterol

Severe obesity

Other complex medical problems

### LOCAL FOLLOW UP WITH GENERAL PRACTITIONER

Diabetics controlled with diet only

Diabetics with no complications on tablets and

Good sugar control

Good blood pressure control

Cholesterol within guidelines

### DIABETIC PATIENT FOLLOW UP SHOULD INCLUDE

Diabetics with complications should be seen at 6 monthly Diabetics with no complications should be seen at least yearly

At each yearly review the patient should have their

Blood pressure checked

Feet examined

Vision tested

Eyes dilated and examined

Urine tested for microalbuminuria

Blood tested should include

Kidney function, Liver function

Lipids (Cholesterol)

HbA1c (long term sugar control)

## **Pregnancy and Diabetes**

### BEFORE PREGNANCY

Use contraception until planning pregnancy
If planning pregnancy consult your doctor as soon as possible
It is very important that you have excellent glucose control before pregnancy
You should

Have all your medications reviewed Commence Folate 5mg once a day Have your eyes dilated a assessed Obtain a pregnancy testing kit

### In Type 1 Diabetes

Your insulin should be switched to 4 times a day regime

### In Type 2 Diabetes

Your should be treated with a twice daily insulin regime Your diabetic tablets will be stopped You should do regular blood glucose monitoring Insulin doses will be adjusted so your HbA1c is <7.5%

### **DURING PREGNANCY**

Check a pregnancy test if you miss a period
If this is negative repeat test after 1 week
If Pregnancy test is positive
Notify GP and Diabetic nurse specialists at Hammersmith Hospital
You will be seen within 7 days at the diabetic antenatal clinic
You will then have 2 to 4 week follow up appointments at this clinic
Your eyes should be dilated and assessed 3 times during pregnancy

### Glucose control during pregnancy

Your should do glucose monitoring 4 to 6 times per day Glucose targets are

Before meals glucose < 5.5

1 hour after meals glucose <8

The diabetic nurse specialists will advise you about your control by phone

# **Appendix I**

## **Appointment Policy**

### **NEW REFERRAL POLICY**

GP in Hammersmith Area (W12/W3/(small part W5))

Appointment with DNS, Dietitians and out patients HH (DNP) GP in Charing Cross Area (W4/W6/W14/SW6)

Appointment with DNS, Dietitians and out patients CXH (M24)

**GP** outside these areas

Send out of area letter (Appendix I)

### **NEW PATIENT POLICY**

**DNA** the **DNS** appointment

See patient at the medical outpatient appointment

Patient seen in medical outpatient

Follow up DICL (HH) or D26/U12(CXH)

**DNA** new patient appointment

Discharge patient letter to GP re referral (appendix I)

### FOLLOWUP PATIENT POLICY

Patient seen in medical outpatient

Follow up DICL(HH)or D26/U12(CXH)

discuss with consultant if <1 year follow up

**DNA** followup appointment

make next routine follow up DICL (HH) or D26/U12(CXH)

if urgent discuss with consultant

2XDNA followup appointment

Discharge patient letter to GP re referral (appendix I)

### **Diabetic Clinic Codes**

## **Hammersmith Hospital**

### **DNS** clinics

Tuesday am new patients	DBNC(6)
Tuesday pm follow up	BDN2(6)
Thursday am follow up	DTNC(14)
Thursday pm follow up	DTN2(5)

### **Medical outpatient clinics**

Diabetic new patient list	DNP(10)
Diabetic Type II follow up	DICL(40)
Diabetic Type I follow up (1 <sup>st</sup> week even months)	DMT1(40)
Diabetic Emergency follow up (within 2/12)	DEM(5)
Diabetic Foot clinic (1 <sup>st</sup> week of month)	DMFT(5)

### **Medical retinopathy clinics**

Diabetic retinopathy	DOC1(30)
Diabetic retinopathy screening	DRFC

### **Charing Cross Hospital**

### **DNS** clinics

Monday am follow up review clinic	D28(14)
Tuesday pm new type II patients	D24(3)
Thursday am new patient clinic	D105(5)
Friday am review clinic	D106(14)

### **Medical outpatient clinics**

Diabetic new patient clinic	M24(10)
Diabetic follow up Type II	D26(40)
Diabetic follow up Type I (1 <sup>st</sup> week even months)	U12(40)
Diabetic Emergency follow up (within 2/12)	444(5)
Eyes only review (within 2/12)	K74(3)
Diabetic Foot clinic	FTDM(6)

## Standard Letters for Hammersmith Hospital

### Area for diabetic clinic W3, W12 small part W5

New referral out of area letter	68
No diagnostic criteria letter	69
OGTT result letter	70
New patient DNA letter	71
One time DNA and out of area letter	72
One time DNA and in area letter	73
Two times DNA in area letter	74
Discharge letter	75
Letter to all clinic patients attending clinic	76
Appointment request from patient	77
Information sheet to discharged patients	78

Direct Line:	020 8383 4823
Internal Ext:	34823
Fax:	020 8283 3360
Appointments	020 8383 5000
Ref:	
Date:	
Clinic Date:	
	HAMMERSMITH HOSPITAL DIABETIC CLINIC
GP Address	
Dear Dr	
RE:	
referrals and ou	your referral letter for this patient with Diabetes. Unfortunately due to the high rate of new local ur follow up clinics being fully booked for more than 1 year, it is difficult for us to see patients from all area. I would be grateful therefore if you could, in the first instance refer this patient to your services.
Our local area i	ncludes W3, W12 and a small part of W5.
Kind regards.	
Yours sincerely	<i>I</i> ,

Direct Line:	020 8383 4823		
Internal Ext:	34823		
Fax:	020 8283 3360		
Appointments	020 8383 5000		
Ref:			
Date:			
Clinic Date:			
	<u>HAMM</u>	ERSMITH HOSPITAL DIABETIC CL	<u>NIC</u>
GP Address			
Dear Dr			
RE:			
•	o the high frequency o	this patient. Unfortunately your referral of new diabetic referrals would be grateful i	•
•		T BE USED FOR DIAGNOSIS) rement (1x if symptomatic)	
ZA Kul	=11.1	Diabetes Mellitus	
	<11.1	Normal if =6.1 do 2x fasting	

=7.0 Diabetes Mellitus

=6.1 but <7.0 Impaired Fasting Glucose do OGTT

<6.1 Normal

2x Fasting Glucose Measurement (1x if symptomatic)

#### Oral Glucose Tolerance Test 2h Glucose

=11.1 Diabetes Mellitus

=7.8 but <11.1 Impaired Glucose Tolerance

< 7.8 Normal

We are most grateful for your help with this and will make a new patient appointment as soon as we receive the re-referral

Kind regards.

Yours sincerely,

Direct Line:	020 8383 4823	3	
Internal Ext:	34823		
Fax:	020 8283 3360	)	
Appointments:	020 8383 5000	)	
DATE			
		HAMMF	RSMITH HOSPITAL DIABETIC CLINIC
	_		
GP Address:			
			GP Address Sticker
Re patient:	L		
			Patient Sticker
	L		
Vour nationt ha	d on oral alu	ooco toloro	nas tast an
Your patient na	d an orai giud	cose toleral	nce test on
The results den WHO Diagnostic Cr Fasting Glucose		t the patient	t
rasting olucose	=7.0		Diabetes Mellitus
	=6.1 <6.1	but < 7.0	Impaired Fasting Glucose Normal
2h Glucose durin	g Oral Glucose =11.		Test Diabetes Mellitus
	=7.8	but <11.1	Impaired Glucose Tolerance
	<7.8		Normal
If the patient had and at least year			cose or impaired glucose tolerance we would recommend life style advice
We have not m	ade any furth	ner follow u	p appointment.
Kind regards. Yours sincerely	<i>J</i> .,		

Internal Ext:	34823
Fax:	020 8283 3360
Appointments:	020 8383 5000
Clinic Date:	
	HAMMERSMITH HOSPITAL DIABETIC CLINIC
GP Address:	GP Address Sticker
Re patient:	
	Patient Sticker

We are sorry that your patient did not attend their appointment at the new diabetic clinic.

Due to the high frequency of new patient referrals we have not made a follow up appointment for your patient. If you wish to re-refer the patient we would be grateful if you could confirm that they are prepared to will attend the hospital diabetic clinic. n addition, we would be grateful if you could and ask them to rearrange the appointment date if they are unable to attend as their non-attendance prevents other urgent patients from being seen. Kind regards.

Yours sincerely,

Direct Line:

020 8383 4823

Anne Dornhorst DM FRCP/ Duncan Bassett MA PhD MRCP

#### Consultants in Endocrinology and Diabetes

cc Patient

Internal Ext:	34823		
Fax:	020 8283 3360		
Appointments:	020 8383 5000		
Clinic Date:			
		HAMMERSMITH HOSPITAL DIABETIC CLINIC	<u>C</u>
GP Address:			
		GP Address Sticker	
	_		
Re patient:		,	
		Patient Sticker	
		r patient has not attended today's clinic appointment at Immersmith Hospital.	nd it may be because of
If you would lik to a more local		nic follow-up for this patient, the patient may be more co	ompliant if you referred them
We have not ar	ranged anoth	er appointment.	
Yours sincerely	у,		

Direct Line:

020 8383 4823

#### Consultants in Endocrinology and Diabetes

cc Patient

Internal Ext:	34823	
Fax:	020 8283 3360	
Appointments:	020 8383 5000	
Clinic Date:		
		HAMMERSMITH HOSPITAL DIABETIC CLINIC

Patient Sticker

We are sorry that you did not attend the diabetic clinic today

Because of the large number of diabetic patients already under follow up and the high rate of new referrals the clinic is fully booked for the next year and there are no routine appointments available in the next 12 months. This means if you miss a diabetic clinic appointment you will not receive a new appointment for another year. It is therefore very important that you attend all your diabetic appointments and have a blood test and urine test done at Hammersmith Hospital 2 weeks before the appointment.

If you fail to attend 2 appointments in succession you will be discharged from the clinic and will require a new referral from your GP to be seen again.

Of course should you develop a new problem your GP can write an emergency referral and we may see you sooner if this is necessary.

We have given you the next available routine appointment, which will be in about 1 year. The details of which will be sent to you in the next few weeks. During the next few months we would advise you to see your GP to check your blood pressure, vision, renal function, glucose control (HbA1c) and cholesterol.

Yours sincerely,

Direct Line:

Patient:

020 8383 4823

Appointments: 020 8383 500	00
Clinic Date:	
	HAMMERSMITH HOSPITAL DIABETIC CLINIC
GP Address:	
	GP Address Sticker
Re patient:	
	Patient Sticker
Ma ana anni ta anni ta	un matient le comat attended the clock O diele the click of any clicker and
we are sorry to say that yo	our patient has not attended the last 2 diabetic clinic appointments.

It may be that the patient has moved address. If you have a different address and you would still like diabetic

We have not arranged another appointment.

clinic follow-up for this patient, please send us another referral with the correct address.

Direct Line:

Internal Ext:

Fax:

020 8383 4823

020 8283 3360

34823

#### Consultants in Endocrinology and Diabetes

cc Patient

Direct Line: 020 8383 4823

Internal Ext: 34823

Fax: 020 8283 3360 **Appointments** 020 8383 5000

Ref: Date: Clinic Date:

#### HAMMERSMITH HOSPITAL DIABETIC CLINIC

**GP Address** 

**GP Address** 

RE: Patient Sticker

Your patient was reviewed in the diabetic clinic today and is considered suitable for discharge from this clinic as they have type II diabetes, are well controlled on diet / sub-maximal oral therapy and have no significant diabetic complications.

Present Medication	Results Date:	
	Blood Pressure	(<145/85)
	BMI	(<35)
	HbA1c	(<8.5%)

(<125mmol/l) Creatinine

Chol/HDL ratio (<5.5)Urine Alb/Cre ratio (<3.0)Left: Acuity Right:

We have advised your patient that they should be seen at least annually in the practice. Annual review should include a minimum of blood pressure measurement, examination of the feet for peripheral pulses and evidence of peripheral neuropathy. Visual Acuity and dilated fundoscopy should be performed annually either in the practice, by an optician or at the Hammersmith retinal screening clinic. Blood test should include renal function, full fasting lipid profile including HDL and LDL, HbA1c and liver function and CK where appropriate. Urine testing should include urine dipstick analysis and urine albumin/creatinine ratio.

We will be happy to see your patient again in the Hammersmith diabetic clinic should they develop diabetic complications or their control fall outside the above ranges.

Kind regards.

Yours sincerely,

Cc Dr Andrew Western

Cc The Patient

Direct Line: 020 8383 4823 Internal Ext: 34823

Fax: 020 8283 3360 Appointments 020 8383 5000

Ref: Date: Clinic Date:

#### HAMMERSMITH HOSPITAL DIABETIC CLINIC

#### To all patients attending the Hammersmith diabetic follow up clinic

Dear Sir/Madam,

This letter is just to inform you about out patient appointments in the Hammersmith diabetic clinic and to help us give a better service to you and all our diabetic patients.

With the present number of staff we are only able to see diabetic patients once per year unless they have diabetic complication affecting their eyes or kidneys when they will be seen every six months.

Of course should you develop a new problem your GP can write an emergency referral and we may see you sooner if this is necessary.

Because of the large number of diabetic patients already under follow up and the high rate of new referrals the clinic is fully booked for the next year and there are no routine appointments available in the next 12 months. This means if you miss your diabetic clinic appointment you will not receive a new appointment for another year. It is therefore very important that you attend all your diabetic appointments and have a blood test and urine test done at Hammersmith Hospital 2 weeks before the appointment.

If you fail to attend 2 appointments in succession you will be discharged from the clinic and will require a new referral from your GP to be seen again.

If you have any questions please discuss them when you see the doctor in clinic today.

Direct Line: 020 8383 4823 Internal Ext: 34823

Fax: 020 8283 3360 Appointments 020 8383 5000

Date: Ref:

#### **HAMMERSMITH HOSPITAL DIABETIC CLINIC**

Dear

#### Thank you for your request for an earlier Diabetic Clinic appointment

We are very sorry but we are unable to make an earlier appointment. Unfortunately because of the large number of diabetic patients already under follow up and the high rate of new referrals the clinic is fully booked for the next year and there are no routine appointments available in the next 12 months. This means if you have missed a diabetic clinic appointment there is no appointment available until next year.

It is therefore very important that you attend all your diabetic appointments and have a blood test and urine test done at Hammersmith Hospital 2 weeks before the appointment.

Of course should you develop an urgent new problem your GP can write an emergency referral and we will see you sooner if this is necessary.

If you have any concerns please discuss these with your GP. During the next few months we would also advise you to see your GP to check your blood pressure, vision, renal function, glucose control (HbA1c) and cholesterol.

We apologise for the inconvenience.

Best wishes.

Anne Dornhorst DM FRCP/ Duncan Bassett MA PhD MRCP Consultants in Endocrinology and Diabetes

cc GP

Direct Line: 020 8383 4823

Internal Ext: 34823

Fax: 020 8283 3360

Appointments: 020 8383 5000

#### Advise to patient discharged for Hammersmith Diabetic Clinic

You have been discharged form the diabetic clinic as your diabetes is well controlled.

To continue this good control you should be seen by your general practitioner at least once or twice a year.

At least once a year you should have your

blood pressure checked vision tested eyes examined feet examined your weight measured

You should have a urine test to check for protein

You should have blood tests for

Kidney function Liver function Lipids (Cholesterol)

**HbA1c** (long term sugar control)

In the future your diabetes may become less well controlled and your GP can of course refer you back to our clinic

## **Standard Letters for Charing Cross**

Area for diabetic clinic W4, W6, W14 and SW6		
New referral out of area letter	80	
No diagnostic criteria letter	81	
OGTT result letter	82	
New patient DNA letter	83	
One time DNA and out of area letter	84	
One time DNA and in area letter		85
Two times DNA in area letter	86	
Discharge letter	87	
Letter to all clinic patients attending clinic	88	
Appointment request from patient	89	
Information sheet to discharged patients	90	

Direct Line:	020 8840 1003/1007
Internal Ext:	1065/1067
Fax:	020 8846 1862
Appointments	020 8383 5000
Ref: Date: Clinic Date:	
	CHARING CROSS HOSPITAL DIABETIC CLINIC
GP Address	
Dear Dr	
RE:	
referrals and o	your referral letter for this patient with Diabetes. Unfortunately due to the high rate of new local ur follow up clinics being fully booked for more than 1 year, it is difficult for us to see patients from all area. I would be grateful therefore if you could, in the first instance refer this patient to your services.
Our local area i	ncludes W4, W6, W14 and SW6.
Kind regards.	
Yours sincerely	<i>1</i> ,

Anne Dornhorst DM FRCP/ Duncan Bassett MA PhD MRCP

Consultants in Endocrinology and Diabetes

Direct Line:	020 8846 1065/1067	
Internal Ext:	1065/1067	
Fax:	020 8846 1862	
Appointments	020 8383 5000	
Ref: Date: Clinic Date:		
	CHARING CR	OSS HOSPITAL DIABETIC CLINIC
GP Address		
Dear Dr		
RE:		
	to the high frequency of new	atient. Unfortunately your referral contains no diagnostic criteria for diabetic referrals would be grateful if you would confirm the diagnosis
-	teria (HBA1c CAN NOT BE Undom Glucose Measurement	
		betes Mellitus
	<11.1 Nor	mal if =6.1 do 2x fasting
2x Fas	ting Glucose Measurement (	
		oetes Mellitus
Oral G	lucose Tolerance Test 2h Gl	aired Fasting Glucose do OGTT
Oral O		betes Mellitus
		aired Glucose Tolerance
	<7.8 Nor	
We are most gre-referral	rateful for your help with this	and will make a new patient appointment as soon as we receive the
Kind regards.		
Yours sincerely	у,	

Direct Line:	020 8846 106	55/1067		
Internal Ext:	1065/1067			
Fax:	020 8846 186	2		
Appointments	020 8383 500	0		
DATE				
		CHARIN	G CROSS HOSPITAL DIABETIC CLIN	<u>IIC</u>
GP Address:				
			GP Address Sticker	
Re patient:				1
			Patient Sticker	
			T dilotti ottokol	
Your patient ha	d an oral glu	ıcose tolera	nce test on	
The results den	nonstrate tha	at the patien	t	
WHO Diagnostic Ci	riteria			
Fasting Glucose	=7.	Λ	Diabetes Mellitus	
		1 but < 7.0	Impaired Fasting Glucose Normal	
2h Glucose durin	g Oral Glucos	e Tolerance 1	est	
	=11 =7.8 <7.8	8 but <11.1	Diabetes Mellitus Impaired Glucose Tolerance Normal	
If the patient had and at least year			ose or impaired glucose tolerance we woul	ld recommend life style advice
We have not m	ade any furt	her follow u	p appointment.	
Kind regards.				
Yours sincerely	<b>y</b> ,			

Direct Line:	020 8846 1065/1067	
Internal Ext:	1065/1067	
Fax:	020 8846 1862	
Appointments	020 8383 5000	
Clinic Date:		
	CHARING CROSS HOSPITAL DIABETIC CLINIC	
GP Address:	GP Address Sticker	
Re patient:		
	Patient Sticker	
We are sorry th	at your patient did not attend their appointment at the new diabetic clinic.	
Due to the high frequency of new patient referrals we have not made a follow up appointment for your patient. If you wish to re-refer the patient we would be grateful if you could confirm that they are prepared to will attend the hospital diabetic clinic. In addition, we would be grateful if you could and ask them to rearrange the appointment date if they are unable to attend as their non-attendance prevents other urgent patients from being seen.		
Kind regards.		
Yours sincerel	'	

cc Patient

Internal Ext:	1065/1067		
Fax:	020 8846 1862		
Appointments	020 8383 5000		
Clinic Date:			
	CHARING CROSS HOSPITAL DIABETIC CLINIC		
GP Address:	GP Address Sticker		
Re patient:			
	Patient Sticker		
We are sorry to say that your patient has not attended today's clinic appointment and it may be because of transport difficulties to the Charing Cross Hospital diabetic clinic.			
If you would like diabetic clinic follow-up for this patient, the patient may be more compliant if you referred them to a more local hospital.			
We have not arranged another appointment.			
Yours sincerely	y,		

Anne Dornhorst DM FRCP/ Duncan Bassett MA PhD MRCP

Consultants in Endocrinology and Diabetes

Direct Line: 020 8846 1065/1067

cc Patient

Internal Ext: 1065/1067

Fax: 020 8846 1862

Appointments 020 8383 5000

Clinic Date:

CHARING CROSS HOSPITAL DIABETIC CLINIC

Patient Sticker

We are sorry that you did not attend the diabetic clinic today

Because of the large number of diabetic patients already under follow up and the high rate of new referrals the clinic is fully booked for the next year and there are no routine appointments available in the next 12 months. This means if you miss a diabetic clinic appointment you will not receive a new appointment for another year. It is therefore very important that you attend all your diabetic appointments and have a blood test and urine test done at Charing Cross Hospital 2 weeks before the appointment.

If you fail to attend 2 appointments in succession you will be discharged from the clinic and will require a new referral from your GP to be seen again.

Of course should you develop a new problem your GP can write an emergency referral and we may see you sooner if this is necessary.

We have given you the next available routine appointment, which will be in about 1 year. The details of which will be sent to you in the next few weeks. During the next few months we would advise you to see your GP to check your blood pressure, vision, renal function, glucose control (HbA1c) and cholesterol.

Yours sincerely,

Direct Line:

Patient:

020 8846 1065/1067

#### Consultants in Endocrinology and Diabetes

cc GP

Direct Line:	020 8846 1065/1067		
Internal Ext:	1065/1067		
Fax:	020 8846 1862		
Appointments	020 8383 5000		
Clinic Date:			
	CHARING CROSS HOSPITAL DIABETIC CLINIC		
GP Address:	GP Address Sticker		
Re patient:			
	Patient Sticker		
We are sorry to	say that your patient has not attended the last 2 diabetic clinic appointments.		
	the patient has moved address. If you have a different address and you would still like diabetic for this patient, please send us another referral with the correct address.		
We have not an	ranged another appointment.		
Yours sincerely	<i>'</i> ,		

#### Consultants in Endocrinology and Diabetes

Cc Patient

Direct Line: 020 8846 1065/1067

Internal Ext: 1065/1067
Fax: 020 8846 1862
Appointments 020 8383 5000

Ref: Date: Clinic Date:

# GP Address GP Address GP Address RE: Patient Sticker

Your patient was reviewed in the diabetic clinic today and is considered suitable for discharge from this clinic as they have type II diabetes, are well controlled on diet / sub-maximal oral therapy and have no significant diabetic complications.

Present Medication	ent Medication Results Date:		
	Blood Press	sure	(<145/85)
	BMI		(<35)
	HbA1c		(<8.5%)
	Creatinine		(<125 <b>m</b> mol/l)
	Chol/HDL ra	atio	(<5.5)
	Urine Alb/C	re ratio	(<3.0)
	Acuity	Right:	Left:

We have advised your patient that they should be seen at least annually in the practice. Annual review should include a minimum of blood pressure measurement, examination of the feet for peripheral pulses and evidence of peripheral neuropathy. Visual Acuity and dilated fundoscopy should be performed annually either in the practice, by an optician or at the Hammersmith retinal screening clinic. Blood test should include renal function, full fasting lipid profile including HDL and LDL, HbA1c and liver function and CK where appropriate. Urine testing should include urine dipstick analysis and urine albumin/creatinine ratio.

We will be happy to see your patient again in the Hammersmith diabetic clinic should they develop diabetic complications or their control fall outside the above ranges.

Kind regards.

Yours sincerely,

#### Consultants in Endocrinology and Diabetes

Cc Dr Andrew Western Cc The Patient Direct Line: 020 8846 1065/1067

Internal Ext: 1065/1067
Fax: 020 8846 1862
Appointments 020 8383 5000

#### **CHARING CROSS HOSPITAL DIABETIC CLINIC**

To all patients attending Charing Cross diabetic follow up clinic

Dear Sir/Madam,

This letter is just to inform you about out patient appointments in the Hammersmith diabetic clinic and to help us give a better service to you and all our diabetic patients.

With the present number of staff we are only able to see diabetic patients once per year unless they have diabetic complication affecting their eyes or kidneys when they will be seen every six months.

Of course should you develop a new problem your GP can write an emergency referral and we may see you sooner if this is necessary.

Because of the large number of diabetic patients already under follow up and the high rate of new referrals the clinic is fully booked for the next year and there are no routine appointments available in the next 12 months. This means if you miss your diabetic clinic appointment you will not receive a new appointment for another year. It is therefore very important that you attend all your diabetic appointments and have a blood test and urine test done at Charing Cross Hospital 2 weeks before the appointment.

If you fail to attend 2 appointments in succession you will be discharged from the clinic and will require a new referral from your GP to be seen again.

If you have any questions please discuss them when you see the doctor in clinic today.

Direct Line: 020 8846 1065/1067

Internal Ext: 1065/1067

Fax: 020 8846 1862

Appointments 020 8383 5000

Date: Ref:

#### CHARING CROSS HOSPITAL DIABETIC CLINIC

Dear

#### Thank you for your request for an earlier Diabetic Clinic appointment

We are very sorry but we are unable to make an earlier appointment. Unfortunately because of the large number of diabetic patients already under follow up and the high rate of new referrals the clinic is fully booked for the next year and there are no routine appointments available in the next 12 months. This means if you have missed a diabetic clinic appointment there is no appointment available until next year.

It is therefore very important that you attend all your diabetic appointments and have a blood test and urine test done at Hammersmith Hospital 2 weeks before the appointment.

Of course should you develop an urgent new problem your GP can write an emergency referral and we will see you sooner if this is necessary.

If you have any concerns please discuss these with your GP. During the next few months we would also advise you to see your GP to check your blood pressure, vision, renal function, glucose control (HbA1c) and cholesterol.

We apologise for the inconvenience.

Best wishes,

cc GP

Direct Line: 020 8846 1065/1067

Internal Ext: 1065/1067

Fax: 020 8846 1862

Appointments 020 8383 5000

#### Advise to patient discharged for Charing Cross diabetic clinic

You have been discharged form the diabetic clinic as your diabetes is well controlled.

To continue this good control you should be seen by your general practitioner at least once or twice a year.

At least once a year you should have your

blood pressure checked vision tested eyes examined feet examined your weight measured

You should have a urine test to check for protein

You should have blood tests for

Kidney function Liver function Lipids (Cholesterol) HbA1c (long term sugar control)

In the future your diabetes may become less well controlled and your GP can of course refer you back to our clinic

## **Appendix II**

## **HbA**<sub>1c</sub>: Method & Interferences

HbA<sub>1c</sub> is formed by non-enzymatic glycosylation of the N-terminal valine of the βchain of haemoglobin.

 $HbA_{lc}$  is measured in the Hammersmith by  $\mbox{HPLC-boronate}$  affinity chromatography.

This method is **not** affected by:

- Fetal haemoglobin (HbF)
- Haemoglobin variants (HbS, HbC, HbD)
- Carbamylated Hb (such as in uraemia)

However, it must be remembered that if any of these conditions result in increased red cell turnover, then although there is not direct analytical interference, the shortened red cell (Hb) half life will result in a reduction in  $HbA_{1c}$ .

This method has been shown to have good within-laboratory precision, although it may be less satisfactory between laboratories.

I don't have specific information on the thalassemia traits, although as the rate of red cell turnover in these patients is pretty constant then it is presumably reasonable to compare within patient  $HbA_{1c}$  results.

## **Appendix IV**

### THE HAMMERSMITH DIABETIC CLINIC NHS

#### CONSULTANTS

**Professor Steve Bloom** Dr Anne Dornhorst

Dr Duncan Bassett

**Dr Dominic Withers** 

Dr Karim Meeran

Dr Jeannie Todd

#### CLINICAL ASSISTANT

Dr Shahenaz Walji

#### DIABETIC NURSES

Debbie Lake Marie O'Conner Jane Ormond Ursula Kirwan Molly Nanka-Bruce

#### **DIETITIANS**

**Dr Gary Frost** Linda Carter

PODIATRISTS

Trusha Patel **Annabel Trimble** 

#### **PATIENT LABEL**

**Endocrine Secretaries** 

Tel:

020

Fax: 020 8383 3360 **Appointments Office** Tel: 020 8383 5000

Fax: 020 8383 8383

**Diabetic Nurse Specialists** Tel: 020 8383 4693 24h Emergency Service Tel: 020 8383 1000

Ask for Endocrine SpR

Dear Dr	DATE	2002
Your patient was reviewed in the diabetic clinic today.		

DIAGNOS	ES	AGE:	•	
1. Type_	_DM;	Years diagnosed	<u>v</u>	
2.				
3.				
4.				
5.				
6.				
SMOKIN	IG (YES	NO ):		

PRESENT MEDICATIONS		
1.	8.	
2.	9.	
3.	10.	
4.	11.	
5.	12.	
6.	13.	
7.	14.	

RESULTS (date): BM Gluce	ose
Wt change and BMI (<27)	Kg Kg/m2
HbA1c (<8.0%)	%
Creatinine (<120 mnol/l)	<b>m</b> ol/l
Urine Alb/Cre (2)	
Urine Dipstick (NAD)	
Cholesterol (<5.0mmol/l)	mmol/l
Triglycerides(<2.3 mmol/l)	mmol/l
HDL (>1.0mmol/l)	mmol/l
LDL (<3.5mmol/l)	mmol/l
Chol/HDL ratio (<5.0)	
LFTs (if on statin)	
CK (statin/fibrate) (<200)	U/I
FT4 (9-26pmo/l)	pmol/l
TSH $(0.3-4.2mU/l)$	mU/l

EXAMINATION	Right	Left
BP (<140/80)		Standing
Tropicamide		
Pin Hole Acuity		
Retinopathy		
Eye - Other		
Reflexes KJ:		
AJ:		
Sensation VS:		
10g microfilament:		
PP:		
Pulses DP:		
PT:		
Feet		
Injection sites		

#### **NEW EVENTS** PLAN OF ACTION

HBGM/Hypoglycaemia Diet / Exercise Chest pain / Claudication Change in vision Neuropathic pain Foot Infection/Ulcer Pregnancy plans Erectile dysfunction Yours sincerely

 $\mathbf{Dr}$ 

Dr

Next Re	eview	Weeks/Month
	DCN	f 4

(SHO/SpR/Associate Specialist/Consultant) see DSN comment

#### THE CHARING CROSS DIABETIC CLINIC

Dr Stuart McHardy Young

CONSULTANTS



CONSULTANTS

**Professor Steve Bloom Dr Anne Dornhorst** 

**Dr Duncan Bassett** 

**Dr Dominic Withers** 

Dr Karim Meeran

Dr Jeannie Todd

#### DIABETIC NURSES

Debbie Lake **Debbie Hutchins Brenda Lawrence** Ursula Kirwan

#### DIETITIANS

**Dr Gary Frost** Linda Carter

PODIATRISTS

Trusha Patel **Annabel Trimble** 

## PATIENT LABEL

Your patient was reviewed in the Diabetic Clinic today.

DIAGNOSES AGE:

NIDANI DAZIDATEN

1. Type DM;	Years diagnosed <u>y</u>
2.	
3.	
4.	
5.	
6.	
SMOKING YES	NO

**RESULTS** (date): **BM Glucose** 

Wt change and BMI (<27)	Kg Kg/m2
HbA1c (<8.0%)	%
Creatinine (<120 mnol/l)	<b>m</b> mol/l
Urine Alb/Cre (2)	
Urine Dipstick (NAD)	
Cholesterol (<5.0mmol/l)	mmol/l
Triglycerides(<2.3 mmol/l)	mmol/l
HDL (>1.0mmol/l)	mmol/l
LDL (<3.5mmol/l)	mmol/l
Chol/HDL ratio (<5.0)	
LFTs (if on statin)	
CK (statin/fibrate) (<200)	U/I
FT4 (9-26pmo/l)	pmol/l
TSH $(0.3-4.2mU/l)$	mU/l

<b>Endocrine Secretaries</b>	Tel:	020 8846 1065
	-	000 0046 4000

Fax: 020 8846 1080 **Appointments Office** 020 8383 5000 Tel: Fax: 020 8346 7564

**Diabetic Nurse Specialists** Tel: 020 8846 1062 24h Emergency Service Tel: 020 8383 1000

Ask for Endocrine SpR

DATE 2002

#### MEDICATION

ESZABATBIA (DICONI

WEDICATION	
1.	8.
2.	9.
3.	10.
4.	11.
5.	12.
6.	13.
7.	14.

D: 14

EXAMINATION	Right I	<u>eft</u>
BP (<140/80)		Standing
Tropicamide		
PH Acuity		
Retinopathy		
Eye - Other		
Reflexes KJ:		
AJ:		
Sensation VS:		
10g microfilament:		
PP:		
Pulses DP:		
PT:		
Feet		
Injection sites		

PLAN	OF	ACT	TON
	OI.	$\Delta \mathbf{U}$	$1\mathbf{O}11$

NEW EVENIS	
HBGM / Hypoglycaemia	
Diet / Exercise	
Chest pain / Claudication	
Change in vision	
Neuropathic pain / Foot Infection	on/Ulcer
Pregnancy plans	
Erectile dysfunction	
Yours sincerely	
Dr	
Dr	(SHO/SpR/Associate Specialist/Con

Next R	<u>eview</u>	Weeks/Month	
sultant )	see DSN co	mment	