UKONS · The Royal College of Pathologists · Clinical Oncology · bopa · acp · Royal College of Physicians · UK Chemotherapy Board

DIABETES UK
KNOW DIABETES. FIGHT DIABETES.

DISN UK GROUP
SHARING BEST PRACTICE SINCE 2004

JBDS-IP Joint British Diabetes Societies for inpatient care

OPTIMISING OUTCOMES IN CANCER PATIENTS

Outpatient Management of Glycaemic Control in Patients Receiving Cancer Treatments

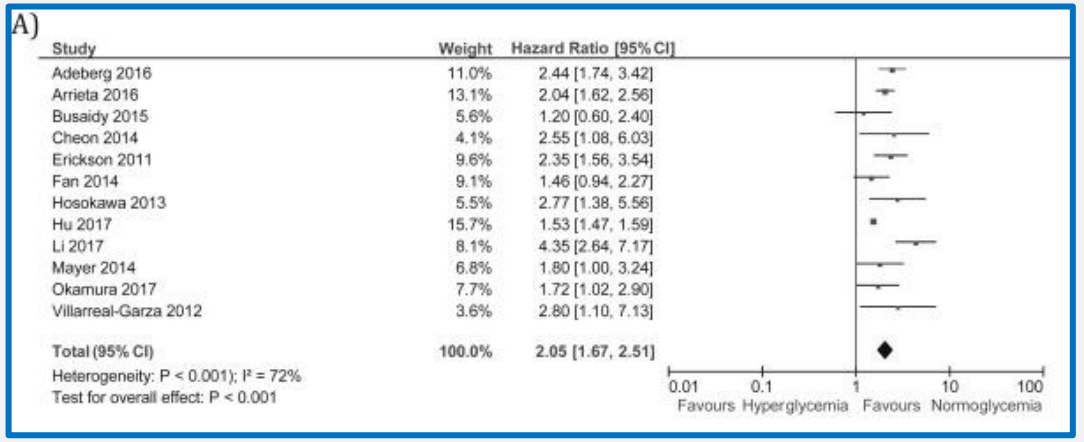
Dr Nalinie Joharatnam-Hogan

THE CLINICAL PROBLEM

- Individuals with diabetes mellitus (DM) are at a higher risk for developing several cancers
- Estimated 20% of cancer patients have concurrent diabetes
- Cancer patients at increased risk of developing new DM or hyperglycaemia
- Oncology patients with diabetes have an increased risk of toxicities/ admissions/ all cause mortality
- Hyperglycaemia may attenuate efficacy of chemotherapy
- Hyperglycaemia is prognostic of worse overall survival (OS) and risk of cancer recurrence
- Meta-Analysis (n=9872 cancer patients, without DM):

  Hyperglycaemia associated with worse OS

  (HR 2.05, 95% CI 1.67–2.51; *P* < 0.001)



UK AUDITS

Christie:

- Plasma HbA1c taken from cancer patients undergoing surgery during routine pre-operative check
- N=475 screened using HbA1c
- **24% had impaired glucose regulation** *(n=15 (3.2%) ≥48+mmol/mol & n=102 patients (21.47%) 42-47 mmol/mol)*

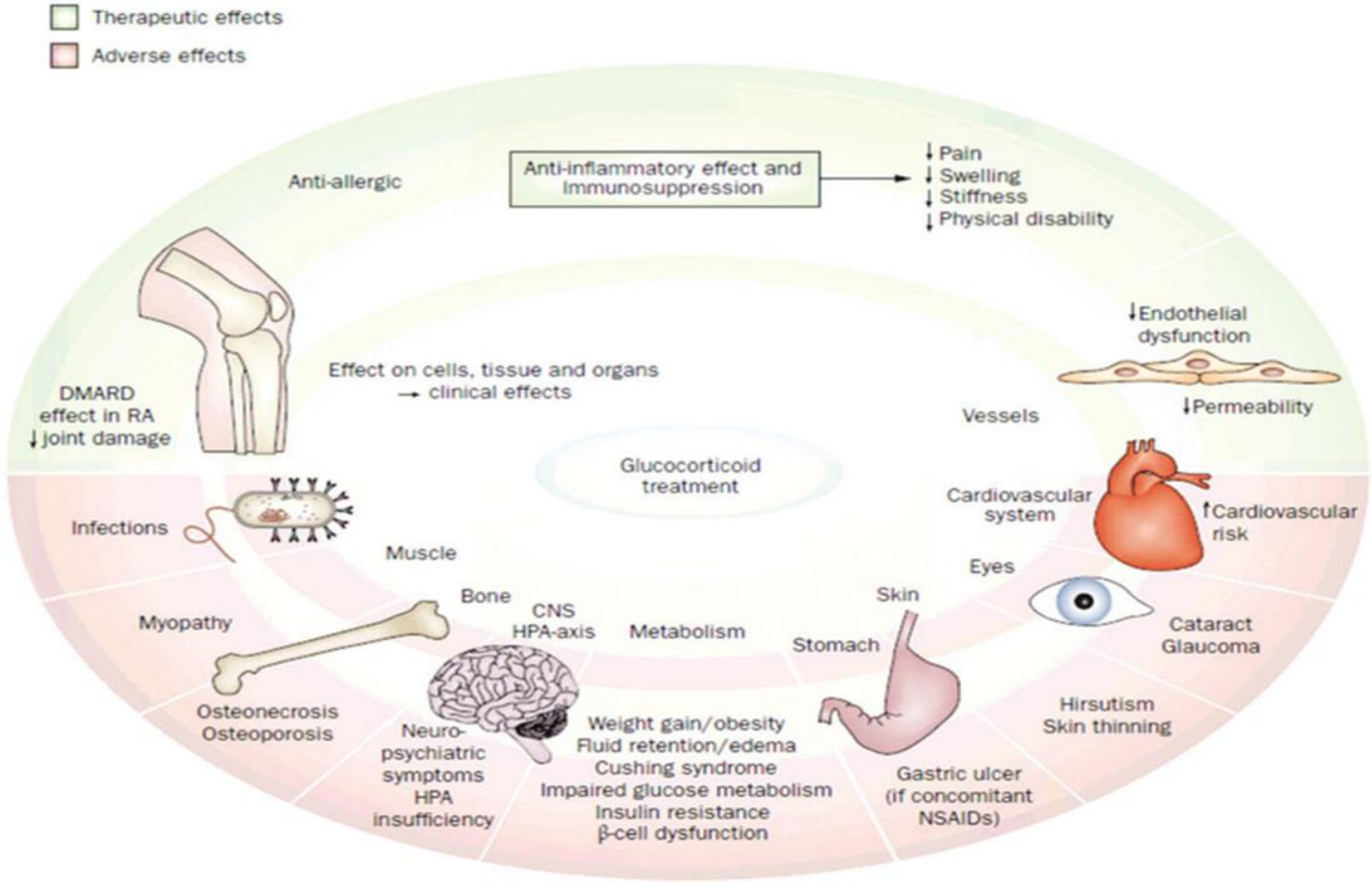
North Middlesex:

- **5% (11/233) of admissions under oncology were related to blood glucose issues**
- 8 out of 11 patients were on steroids
- HbA1c testing in n=134 patients having routine chemotherapy blood tests over a 10 day period, December 2016
- **21% (28/134) HbA1c diagnostic of DM** ; 32 (24%) were at high risk of DM
- 15 (11%) newly diagnosed to have DM from this.

EFFECT OF CANCER ON GLYCAEMIC CONTROL AND QUALITY OF LIFE

- Adherence to glucose lowering drugs often decreases in individuals following a cancer diagnosis
- Hershey et al 2012: Individuals with diabetes and a solid cancer receiving chemotherapy shown to perform significantly fewer diabetes self-management behaviours
- Petitt et al 2017: HbA1c levels increase at a year/2years after diagnosis of cancer in comparison to baseline.
- Glycaemic control plays key role in overall level of health-related quality of life in patients with cancer & DM
- Systematic review (10 studies) evaluated patient reported outcomes (PRO) - having both cancer and DM resulted in worse PROs compared to having either one of the diseases

STEROIDS IN CANCER PATIENTS



- Metastatic spinal cord compression
- Immunotherapy toxicity
- SVCO
- Brain metastases
- Supportive treatment during chemotherapy
- Acute GvHD

WHO IS AT RISK?

Those at particular risk of developing steroid induced diabetes include:

- Individuals already at increased risk of diabetes
  - Family history of diabetes
  - History of gestational diabetes
  - Ethnic minority
  - Obese
  - Older age
  - Polycystic ovarian syndrome (PCOS)

Glucocorticoid (steroid)	Potency (equivalent doses)	Duration of action (half-life, in hours)
Hydrocortisone	30mg	8
Prednisolone	7.5mg	16-36
Methylprednisolone	6mg	18-40
Dexamethasone	1.1mg	36-54
Betamethasone	1.1mg	26-54

- Impaired fasting glucose or impaired glucose tolerance, HbA_{1c} 42-47mmol/mol.
- Previous hyperglycaemia on steroid therapy.
- Individuals receiving concurrent cytotoxic therapy known to cause hyperglycaemia

ANTI-CANCER THERAPIES ASSOCIATED WITH RISK OF DIABETES/HYPERGLYCAEMIA

Targeted therapy

- mTOR e.g. Everolimus
- PI3K e.g. Idelalisib
- EGFR e.g. osimertinib
- Multikinase e.g. pazopanib
- ALK e.g. ceritinib

Chemotherapy

- 5-Fluorouracil
- Pemetrexed
- Oxaliplatin
- Doxorubicin
- Busulfan
- Decitabine
- ATO

Immune Checkpoint Inhibitors

- Nivolumab
- Pembrolizumab
- Ipilumumab
- Combination ICP

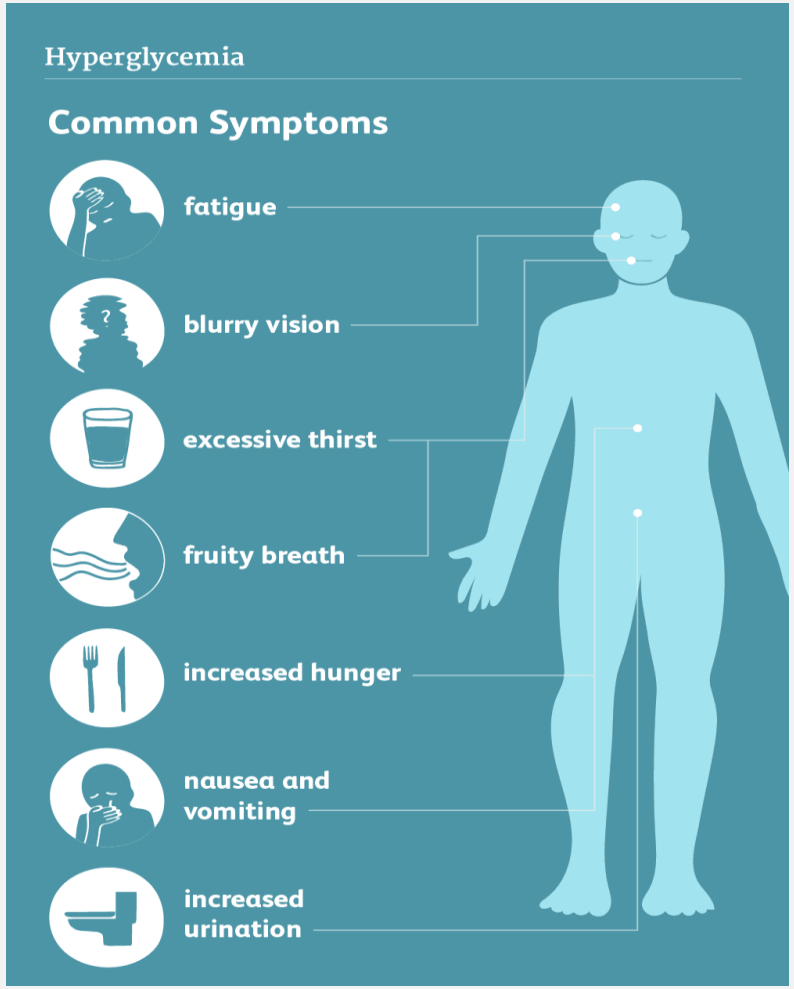
Hormone Therapy

- ADT
- Tamoxifen

RECOGNISING HYPERGLYCAEMIA AND DIABETES

Diagnostic Criteria for Diabetes Mellitus and Abnormal Glucose Tolerance

	Fasting plasma glucose (mmol/l)	2 hour plasma glucose (mmol/l)	Random plasma glucose (mmol/l)	HbA_{1c} / Glycated haemoglobin (mmol/mol)
Normal	≤6.0	<7.8	<7.8	<42 (<6.0%)
Impaired fasting glucose	6.1-6.9	And <7.8	_	_
Impaired glucose tolerance	<7.0	And 7.8-11.0	_	Pre-diabetes: 42-47 (6.0-6.4%)
Diabetes mellitus	≥7.0	Or ≥11.1	≥11.1	≥48 (6.5%)



IDENTIFYING DKA AND HHS

Diabetic Ketoacidosis (DKA)

- Ketonaemia ≥3.0mmol/L or significant ketonuria (more than 2+ on standard urine sticks)
- Blood glucose >11.0mmol/L or known DM
- Bicarbonate ($HCO3^-$) <15mmol/L and/or venous pH<7.3

Hyperglycaemic Hyperosmolar State (HHS)

- Hypovolaemia
- Marked hyperglycaemia (30mmol/L or >) without significant hyperketonaemia (<3mmol/L) or acidosis (pH>7.3, bicarbonate >15mmol/L
- Osmolality usually 320mosmol/kg or more

2 (Na+) + Glucose + Urea (mmol/L)

GUIDANCE FOR THE ONCOLOGY MULTIDISCIPLINARY TEAM

- Aim to provide advice for the oncology MDT to
  - manage patients with diabetes commencing anti-cancer/ steroid therapy
  - identify patients without a known diagnosis of diabetes who are at risk of developing hyperglycaemia and new onset diabetes
  - enable early recognition by oncologists of the potential risks of complications from poor glycaemic control
- Intended for the outpatient management of patients with cancer, particularly in the setting of the oncology clinic, and provision of advice for patients at home
- Provide the oncology MDT with the tools to manage hyperglycaemia in cancer patients

HOW TO USE THESE GUIDELINES

- Joint venture between UKCB and JBDS aiming to summarise the issues around glycaemic control in nonsurgical oncology patients
- Each individual hospital and service is recommended to adopt these guidelines and template information sheets have been provided to be adopted for local use
- It is recommended that local oncology services develop strategic and operational links with their local diabetic specialist teams including nurses and dietetics, both within the hospital and community settings

NATIONAL GUIDELINES

1. The management of hyperglycaemia in oncology patients on cancer therapy without a previous diagnosis of diabetes
   - Commencing Steroid (Glucocorticoid) Therapy
   - Commencing Anti-Cancer Therapy
   - Commencing Immune Checkpoint Inhibitors
   - Hypoglycaemia

2. Commencing Anti-Cancer Therapy in a Person with Pre-Existing Diabetes
   - Management of Nausea and Vomiting
   - When to seek advice in managing a person with diabetes (PWD)

3. Dietary recommendations

4. Communication Aids

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MANAGEMENT OF NAUSEA AND VOMITING IN A PERSON WITH PRE-EXISTING DIABETES

- Highly emetogenic chemotherapy – steroid therapy usually given
- Highly & moderately emetogenic chemotherapy - consider NK1 antagonist with long acting 5HT3 inhibitor (e.g. ondansetron)
- Neurokinin 1 (NK1) antagonists (e.g. aprepitant) can be used with a lower steroid dose, with equivalent efficacy
- Consider steroid in the first cycle and reduce steroid doses/withdraw completely
  - based on the patient's emetic control
  - blood glucose management
- Counsel patient on careful self-monitoring of glucose levels
- Encourage liaison with their usual diabetes care provider

HYPOGLYCAEMIA

SYMPTOMS of HYPOGLYCAEMIA

- Perspiration
- Fatigue
- Dizziness
- Perioral paraesthesia
- Tremor/ Shaking
- Palpitations
- Mood change
- Pallor
- Confusion

SPECIAL CONSIDERATIONS

Immune Checkpoint Inhibitors

- Risk of labile glucose control in patients with new onset ICP-induced insulin deficiency
- Hypoadrenalism

Somatostatin Analogues

- E.g. Octreotide/ Lanreotide
- Treatment of neuroendocrine tumours
- Effect glucose regulation

Patients receiving end of life care

- May not require tight blood glucose control

COMMUNICATION AIDS

Patient Information Sheets

Appendix 2A:

Patient information sheet: 'Developing high bl person not known to have diabetes'

You have been given this information sheet by the Onco have high blood sugar before or during cancer treatmen

Appendix 2B

Patient information sheet - 'Starting anti-cancer diabetes'

About 1 in 10 people receiving cancer treatment also ha been given this information sheet by the Oncology clinic **starting cancer treatment.** Some cancer treatments, a steroids) can raise blood sugar. **This may lead to a worse**

Template Blood Glucose Monitoring Form

Appendix 2E:

Blood glucose monitoring form: Oncology Clinic/Chemotherapy Day Unit

Affix patient label here

Treatment regimen: _____

Pre-treatment bloods (to be documented prior to cycle 1, day 1):

Random venous blood glucose _____ mmol/L Date: _____

HbA_{1c}: _____ mmol/mol Date: _____

Please notify the Oncology team if glucose is >12mmol/L on two separate occasions **or** >20mmol on one occasion

Date	Cycle/Day	Random venous glucose	Notes
		Time	

Template Blood Glucose Diary

)aily blood glucose record chart

1h after evening meal	Comments

NUTRITIONAL SUPPORT

- General Nutritional Advice
- Nutritional Support
  - Oral
  - Enteral
  - Parenteral
- Alternative Diets
- T3cDM
- Hypoglycaemia

WHERE TO FIND FINAL GUIDELINES

https://www.ukchemotherapyboard.org/

UK CHEMOTHERAPY BOARD

https://abcd.care/joint-british-diabetes-societies-jbds-inpatient-care-group

JBDS-IP Joint British Diabetes Societies for inpatient care

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