



DIABETES

Top tips for MURs

- Counsel the patient on the need to take medication regularly and address any compliance issues
- Ask if patient has attended their annual diabetic review (includes tests on their lipids, HbA1c, BP and heart rate; discussion on signs and symptoms of diabetic neuropathy and monitoring foot care)
- Check repeat prescription for drugs that indicate whether the patient already has signs/symptoms of diabetic neuropathy
- Ask patient what their last HbA1c result was
- Check that patients on insulin therapy have an insulin passport
- Counsel patients of SGLT2 inhibitors on signs and symptoms of DKA¹
- If a patient becomes unwell, recommend they follow the 'sick day rules' and test blood glucose levels more frequently. If a patient cannot eat or drink (e.g D&V), they should be referred to their doctor and insulin should not be stopped. Certain medications e.g. SGLT2 inhibitors and metformin may need to be stopped inline with MHRA recommendations
- Advise patient on warning signs and symptoms of hypoglycaemia (see red flags overleaf) and advise to take glucose if experience signs and symptoms of an attack
- Counsel patients on pioglitazone on the need for liver function tests & to report symptoms of heart failure (see red flags overleaf)
- Counsel patient on blood-glucose monitoring and frequency required
- Counsel patient on reason for taking antidiabetic medication and advise them on best time to take medication
- Counsel patient on reason for good injection technique and the need to rotate injection sites
- Counsel patients on SGLT2 inhibitors on signs and symptoms of DKA¹
- Counsel patient on signs and symptoms of complications that need referral (see red flags overleaf) and common side effects (see overleaf)
- Check that the patient has notified the Driver and Vehicle Licensing Agency (DVLA) of their condition and is aware of measures that should be taken to avoid hypoglycaemia
 - Drivers treated with insulin or those taking oral antidiabetic drugs, who are at particular risk of hypoglycaemia should normally check their blood-glucose concentration before driving and on long journeys, at 2-hour intervals
 - Issue patient with updated current guidelines from DVLA (see overleaf for website address)
- Check that the patient has had an annual influenza vaccination
- Report any adverse drug reactions to the Yellow Card Scheme

Pathophysiology of Diabetes

Diabetes mellitus is a metabolic disorder characterised by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism due to a lack of insulin or resistance to its action². Type 1 diabetes occurs as a result of a deficiency of insulin following auto-immune destruction of pancreatic beta cells². Patients with type 1 diabetes require insulin therapy. Type 2 diabetes is due to reduced secretion of insulin or to peripheral resistance to the action of insulin or a combination of both³. Diabetes mellitus may present with characteristic symptoms of thirst, polyuria, blurring of vision and weight loss².

Lifestyle Issues

- Counsel patient on reducing alcohol intake to within safe limits (up to 14 units a week, spread evenly over 3 more days, with several alcohol free days)
- Counsel patient on healthy eating, exercise & weight loss (if BMI > 25kg/m²) - reduce saturated fat and salt intake, increase oily fish intake, complete 30 minutes of aerobic exercise three to five times a week, reduce caffeine intake to no more than 5 cups a day and recommend 5 portions of fruit and vegetables a day (note high sugar content of fruit - may cause hyperglycaemia)
- Encourage patients to achieve their target HbA1c level where possible
- Advise patient who smoke of the benefits of stopping smoking and refer to Stop Smoking Wales or Pharmacy Stop Smoking services if willing to stop

How do insulin and antidiabetic drugs work?

Insulin	Replacement therapy that suppresses the release of glucose from the liver and stimulates peripheral uptake of glucose.
Sulfonylureas	Stimulate the beta cells within the pancreas to produce insulin.
Biguanides	Inhibit the formation of glucose in the liver (gluconeogenesis) and increase utilisation of glucose by the peripheral tissue.
Alpha-glucosidase inhibitor (Acarbose)	Inhibit the alpha-glucosidase enzyme in the intestine and prevents absorption of sugars.
Meglitinides	Promote the secretion of insulin by closing ATP-sensitive potassium channels in beta cell membranes.
Thiazolidinediones (glitazones)	Reduce insulin resistance by enhancing insulin sensitivity, but have no effect on insulin production.
Dipeptidylpeptidase-4 inhibitors (gliptins)	DPP4 inhibitors work by inhibiting DPP4, the enzyme that is responsible for inactivating GLP-1. GLP-1 is a gut hormone that is released in the small intestine only when nutrients are present. GLP-1 stimulates insulin release and inhibits glucagon release ultimately decreasing blood glucose levels.
SGLT2 inhibitors	Reversibly inhibit sodium-glucose co-transporter 2 in the proximal convoluted tubule to block renal reabsorption of glucose and promote excretion of excess glucose into urine.
GLP-1 mimetics	Stimulate insulin release when blood glucose levels are elevated. GLP-1 is a potent antihyperglycaemic hormone, inducing glucose-dependent stimulation of insulin secretion while suppressing glucagon secretion.



Red flags that need referral

- Recurring episodes of hypoglycaemia (sweating, palpitations, tremor, hunger, confusion, drowsiness)
- Signs of diabetic ketoacidosis (nausea, vomiting, abdominal pain, drowsiness, confusion)
- Any symptoms of haematuria, dysuria or urinary urgency
- Any symptoms of liver toxicity with pioglitazone (nausea, vomiting, abdominal pain, fatigue and dark urine)
- Any symptoms of heart failure with pioglitazone (breathlessness, tiredness and weakness, oedema)
- Any symptoms of pancreatitis (abdominal pain, nausea and vomiting)
- Ulceration or degradation of foot tissue, even if it appears minor

What are the common side effects to look out for?

Drug	Common side effects	Recommendation
Insulin	Hypoglycaemia	Refer to prescriber for blood glucose testing and possible dose adjustment.
	Local reaction and fat hypertrophy	Rotate injection site.
Sulfonylureas	Long acting – drug-induced hypoglycaemia	Refer to prescriber.
	Weight gain	Check that appropriate dose is being used. Give lifestyle advice if BMI > 25kg/m - see lifestyle issues section.
Biguanides (Metformin)	Nausea, vomiting and diarrhoea	Always start dosing regimen slowly, with dose being built up over a period of weeks. Provide supportive counselling & explain the benefits of metformin to patients.
Alpha-glucosidase inhibitor (Acarbose)	Flatulence and diarrhoea	Risk can be reduced by introducing the drug gradually. Tends to reduce over time.
Nateglinide and repaglinide	Hypoglycaemia	Advise patient on symptoms of hypoglycaemia.
	Nausea, vomiting, diarrhoea and constipation	Refer to prescriber if not tolerated.
Thiazolidinediones	Liver damage, nausea, vomiting, dark urine, abdominal pain, fatigue, peripheral oedema,	Refer to prescriber.
	Shortness of breath, decreased exercise tolerance, oedema	Stop treatment immediately. Refer to prescriber.
	Haematuria/dysuria (possible signs of bladder cancer)	Refer to prescriber.
Dipeptidylpeptidase-4 inhibitors (Gliptins)	GI disturbances, peripheral oedema, upper respiratory tract infections, nasopharyngitis, sinusitis, myalgia, hypoglycaemia, skin reactions (rare)	Refer to prescriber if not tolerated.
SGLT2 inhibitors	Hypoglycaemia, UTIs/genital infections, back pain, dysuria/polyuria, DKA	Refer to prescriber if not tolerated. Refer immediately to A&E if signs of DKA.
GLP-1 mimetics	GI disturbances, gastro-oesophageal reflux disease, decreased appetite	Refer to prescriber if not tolerated.
	Exenatide – may cause weight loss greater than 1.5 kg weekly (rare)	Refer to prescriber.
	Renal impairment: more likely if patient has diarrhoea & vomiting and on concomitant ACEi, ARBs or diuretics	Refer to prescriber.

Potential serious drug interactions? See BNF Appendix 1 for more details

- Beta-blockers can mask symptoms of hypoglycaemia
- Canagliflozin can increase drug levels of digoxin and dabigatran
- Corticosteroids can worsen glycaemic control in diabetics
- GLP-1 mimetics delay gastric emptying, reducing rate of absorption of other drugs (avoid with narrow therapeutic index medications, medications that require administration with food should be taken at a different time if possible)
- Oral antidiabetic medication and insulin interact with many other medications such as; NSAIDs, anti-bacterials, anti-coagulants, antifungals, cytotoxics, ulcer healing drugs, diuretics and lipid-regulating drugs
- Concomitant use of SGLT2 inhibitors with loop diuretics should be avoided (enhanced diuretic effect, reduced hypoglycaemic effect of SGLT2 inhibitors)

Where can you find more information?

- Endocrine system – BNF 72 sub-section 6.1 Drugs used in diabetes
- Evidence based treatment of diabetes distance learning pack “ Evidence-based management of Diabetes” found on the WCPPE website (<http://www.wcppe.org.uk>)
- NICE guidance: Diabetes – clinical management of Type 1 and Type 2 diabetes can be found on NICE website (<http://www.nice.org.uk>)
- Clinical Knowledge Summary diabetes can be found on CKS website (<http://www.cks.nice.org.uk>)
- Diabetes UK Website (<http://www.diabetes.org.uk/>)
- Guidelines for driving with diabetes mellitus from DVLA <http://www.dft.gov.uk/dvla/medical/Annex%20changes%20to%20Diabetes%20update.aspx>
- RPS ‘Integrating community pharmacy into the care of people with diabetes toolkit’ (<http://www.rpharms.com/support-resources-a-z/diabetes-toolkit.asp>)

References

1. MHRA Update, Updated Advice on the risk of Diabetic Ketoacidosis, April 2016
2. World Health Organization. Definition, Diagnosis and Classification of Diabetes Mellitus and its complications, WHO. Geneva, 1999.
3. Evidence-based management of Diabetes, NICPLD, 2010