

Patients of medication to treat blood glucose levels



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Patients living with diabetes mellitus are either inclined to insulin resistance or when insufficient insulin is produced from the pancreas, resulting to hyperglycaemia and leading to various microvascular and macrovascular complications including 'hypertension' 1-2. This assignment will demonstrate the use of two classes of medication to treat blood glucose levels and hypertension. Medication for Blood Glucose Control 1.

Metformin (Biguanides) Mode of Action Metformin is an antidiabetic drug that contains the ingredient metformin hydrochloride, which belongs to the chemical drug class of biguanide 3. Metformin is the first line and initial drug therapy prescribed specifically to newly diagnosed patients living with type 2 diabetes, especially overweight and obese patients who don't have adequate control over their diet and exercise or are not feasible, which results in uncontrolled blood glucose 4-5. Metformin medication helps promote normal blood sugar levels and helps maintain it constantly 4, 6.

This is enhanced by reducing the quantity of glucose from the liver that's released into the bloodstream and declines the amount of glucose captivated by the intestines; therefore, making the body cells become more adequate and responsive to insulin and enhances the sensitivity mechanisms of the muscle cells to insulin 4, 7-8. Metformin also utilises its constructive effects on glycaemic control, by enhancing peripheral and hepatic sensitivity to insulin 9-11 and can enhance modest weight loss or keep current weight stable 12. Metformin alone works to decrease postprandial blood glucose, fasting plasma glucose, HbA1c levels and prevents hypoglycaemia episodes 13. Metformin medication initially starts from taking once daily dose with breakfast; the dose then steadily increases to 2-3 times a day with main

meals 14-15. Side Effects Common side effects with metformin are usually: drowsiness, dizziness, tiredness, muscle pains and cramps, abdominal discomfort, vomiting, diarrhea and nausea; not all of these side effects may manifest 16. Lactic acidosis is the most serious side effect that's predominately due to accumulation of metformin in the body but it's very rare this side effect occurs 17. Cautions Several precautions should be taken account when prescribing metformin. Patients with kidney complications could suffer from lactic acidosis due to higher quantities of metformin in the system, resulting in the kidneys unable to function adequately 17-18.

Secondly, patients with heart complications shouldn't take metformin due to the heart unable to send sufficient amount of blood to the kidneys, which stops the kidneys from eliminating metformin from the body, resulting in the risk of lactic acidosis 17. However, GP's may test the kidneys and prescribe metformin if appropriate 17. Drinking high amounts of alcohol alongside metformin could cause lactic acidosis and hypoglycaemia; thus, it's vital to educate patients towards alcohol health effects whilst taking metformin 17. Monitoring Metformin can predispose to vitamin B12 deficiency, resulting in homocysteine concentrations 18.

However, this can be preventable and regular measurements of vitamin B12 monitoring should be considered during long-term metformin therapy 18. It's vital to identify if patients have any allergic reaction to metformin ingredients before prescribing 19. Counselling points It's important to counsel patients to take metformin at the same time everyday with meals 20. Secondly, making patients aware of hypoglycaemia and how to overcome low sugar levels.

Even though metformin is unlikely to cause hypoglycaemia, other
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medications patients may take alongside metformin may predispose to low sugar levels, therefore it's important to make patients aware to monitor blood sugar levels regularly, especially before driving and exercising 20. Lastly, it's important that patients are aware of all minor and major side effects (especially lactic acidosis) with metformin and explain what actions should be considered if these side effects arise 16-17. 2. Sitagliptins (DPP-4 Inhibitors) Sitagliptin is an anti-diabetic drug of the dipeptidyl peptidase-4 (DPP-4) inhibitor medication class, which is generally prescribed to patients living with type 2 diabetes mellitus to help lower blood sugar levels, which can also be combined with other anti-diabetic drugs e.

g. metformin 21. Mode of Action Sitagliptins main role is to block the action of DPP-4, which is an enzyme that predominantly destroys gastrointestinal hormone incretins. Incretins is a hormone which produces insulin when it's required (after eating) and decreases the production of glucagon by the liver organ when it's isn't necessary (during digestion) 22. Glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic peptide (GIP) support the action of incretin 23. Patients living with diabetes mellitus do not make sufficient amount of incretin than individuals without diabetes 24. Thus, Sitagliptin medication plays its part by inhibiting DPP-4 that essentially supports the hormone incretin to stay longer in the body, which helps improve meal enticed active GLP-1 AND GIP levels approximately two to threefold 25.

A single dose of 100mg of sitagliptin provides persistent 24-hour prevention of DPP-4 enzyme, which increases activation of GLP-1 and GIP prominent to increase in insulin and C-peptide decline glucogons, which improves in oral <https://assignbuster.com/patients-of-medication-to-treat-blood-glucose-levels/>

glucose tolerance 26. As a result, this inclines insulin to be released that helps lower blood glucose levels to a healthy range, slows down digestion and decreases appetite 24-27. DPP-4 inhibitor (Sitagliptin) can help lower HbA1c to approximately by 0.5% - 0.8% 28.

Side Effects There are many adverse side effects that manifest with sitagliptins (DPP-4) such as: headaches, diarrhoea, nausea, stomach pains, sore throat, skin reactions may manifest and can increase risk of pancreatitis (constant abdominal pain) which disposes to vomiting and nausea 22.

Monitoring Inform patients to consider regular physical examinations e. g.

blood tests, urine tests to be certain that any medication (in this case: DPP-4 medications) are not causing any severe adverse effects to the patient's health and be confident that the prescribed medication is suited to the patient effectively 29. Doctors would monitor kidney function with patients with renal complications and may prescribe lower dosages (normally 25 - 50mg) 30-31. **Cautions** DPP-4 medication should not be prescribed as first line of diabetes therapy but second e. g.

after metformin. 30-31. Sitagliptin should not be prescribed to patients living with type 1 diabetes for treating diabetes ketoacidosis 32. Sitagliptin is associated with acute pancreatitis discomfort; health care professions should inform patients about severe abdominal discomfort and if suspected sitagliptin should be discontinued straight away as well as any allergic reactions 32. Patients with a history of pancreatitis, cautions should be used straight away 32. There is a dosage order for sitagliptin when prescribed to patients with renal complications, therefore, patients need to take renal

function assessments before being prescribed sitagliptins amongst other anti-diabetic medication and should be assessed again after being prescribed a suitable dose, in order to keep track of renal function 32. Counselling Points Counselling patients to take sitagliptin regularly with the prescribed dose given, if patients accidentally missed a dose it should be taken as soon as possible 33. If it's nearer to the next dose, patients should eliminate double dose and get back to regular dosing agenda 33.

Medication for Blood Pressure Control 1. Acebutolol (Beta Blockers) Mode of Action Acebutolol is a medication belongs to the group of medicines of beta-blockers to treat hypertension and irregular heartbeat that works on the heart and blood vessels 34. Acebutolol works by slowing down the action of the heart by preventing messages sent by the nerve to the heart 34-35. This is by blocking the beta-adrenergic receptors where the messages are acknowledged by the heart, which results in the heart beating more slowly with essentially less force that support blood vessels and the heart to stay relaxed 34-35. This therefore, reduces hypertension by decreasing the pressure of blood within the blood vessels and because the heart is using lesser energy it also supports to reduce chest pains if patients suffer from angina; also works to lower heart rate and for the heart's request for oxygen 34-35.

Side Effects Like any other medication, acebutolol has many side effects and the most common ones are: headaches, blurred vision, dizziness, diarrhea, indigestion, fatigue and muscle pains 34-35. When blood pressure and heart rate is low, patients could suffer from severe dizziness and fainting, therefore patients may need medication attention 35. Monitoring NICE <https://assignbuster.com/patients-of-medication-to-treat-blood-glucose-levels/>

guidelines suggest health care professions should monitor lung and kidney function for patients who have a history of airway and renal disease before prescribing acebutolol 36. This is to monitor if these organs are working well, which would help decide if this drug would be safe to use and also if the dose needs to be lowered 35-36. Cautions Before prescribing acebutolol to

female patients, health care professions should examine if they are pregnant or planning to get pregnant, as acebutolol shouldn't be used during pregnancy because it could cause a harmful risk to the unborn baby 35.

Patients with asthma, heart, hyperthyroidism and renal deficiencies; doctors would either put patients on a small dose of acebutolol with a caution, change the medication or completely avoid it depending on the situation 35-36. Special cautions should be suggested to patients with a history of hypersensitivity, as beta-blockers could cause sensitivity to allergic reactions, which could cause severe hypersensitivity reactions 36.

Counselling Points Counselling patients to take this medication regularly as prescribed and don't stop this medication suddenly, as it could incline patients to hypertension and other heart related disorders 37. Patients living with diabetes mellitus should regularly monitor their blood glucose levels, as this medication could possibly predispose to hypoglycaemia symptomology 37. 2. Benazepril (ACE Inhibitors) Mode of Action Benazepril is essentially an angiotensin converting enzyme (ACE) inhibitor medication therapy to treat hypertension 38-39. ACE is an enzyme, which produces the development of angiotensin II in the human body 38.

Angiotensin II triggers contraction of the muscles that surrounds and narrows the arteries, which causes hypertension 40. Thus, benazepril is a ACE
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inhibitor medication that supports to lower blood pressure by stopping the formation of angiotensin II, which essentially relaxes the arteries that's consequential to lowering blood pressure and also progresses pumping productivity of a failing heart, which is an additional advantage for patients with heart failure conditions 40. Side Effects There are several side effects that may manifest with benazepril: dizziness, light headed, tiredness, sweating, fever, headaches, loss of appetite, shortness of breath, rash, chest pains, nausea, joint or muscle pain 40-41. In rare occasions, jaundice and liver dysfunction have been reported from ACE inhibitor medication 40. Thus, Benazepril shouldn't be taken if patients have these known side effects and allergies with ACE inhibitors and seek medical attention if these common side effects still continue 40. Monitoring Its important to monitor patients renal function who are being treated with benazepril, as changes in renal functioning can include acute renal failure, which can predominantly be caused by drugs that prevent renin-angiotensin system 41.

Regular blood pressure assessments should be taken with patients to ensure benazepril is working effectively 42. Cautions Patients renal function that depends on the action of the renin-angiotensin system such as: patients who suffer from kidney disease, heart failure, artery stenosis, volume depletion can be at potential risk of emerging acute renal failure when on benazepril 42. Thus, health care professionals may either withhold or stop benazepril therapy to those patients who develop significant decrease in renal functioning 42. Doctors should investigate if female patients who are pregnant or planning to get pregnant before prescribing benazepril, as it is a

pregnancy category D medication, which could have potential health risks to the unborn baby 43. Counselling Points Counsel patients to avoid taking potassium supplementation or salt alternatives with potassium is important, as potassium in the blood could incline to hazardous levels, which could affect the patient's health 43. Its vital to inform patients to report any indications of infections (e.

g. fever, sore throat etc.) straightaway, as it could be signs of neutropenia 44.