

Module B

Treating Diabetes

5 Intercurrent Illness

Learning aims

Identify common signs of intercurrent illness in residents with diabetes.

Have a clear idea of how to manage a resident with diabetes who develops an intercurrent illness

Definition

- ① Intercurrent illness is the development of a new disease or illness occurring during the progress of another disease
- ① An intercurrent illness may not be related to the other disease in progress
- ① An intercurrent illness in the context of this module is one that may influence the course of diabetes in a resident
- ① People with diabetes have an increased risk of intercurrent illnesses, for example, bacterial and fungal infections.

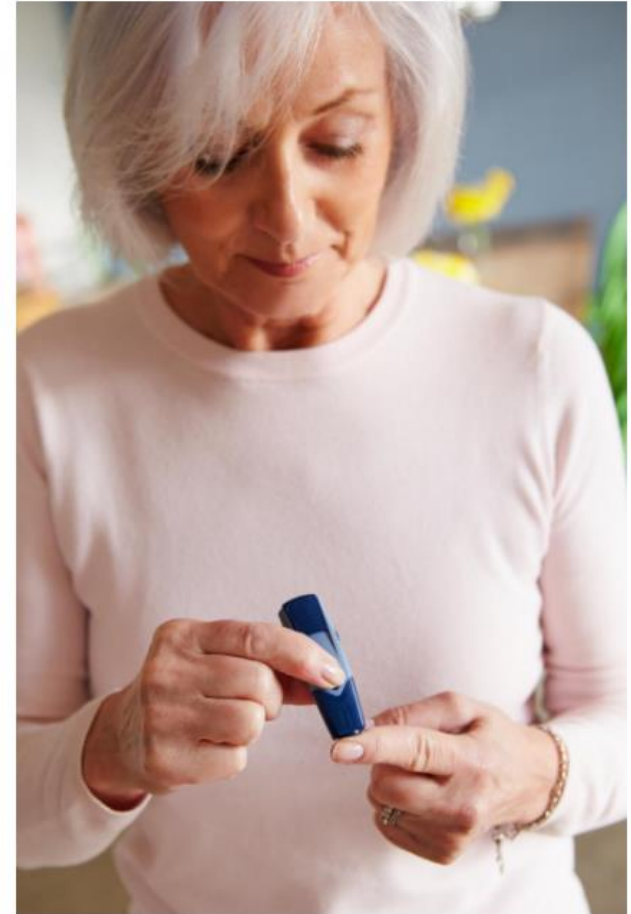


Examples of Intercurrent illness

- ① The combination of nerve damage, poor circulation and hyperglycaemia predispose residents with diabetes to skin and soft tissue infections.
- ① Examples are:
 - infected diabetic foot ulcers
 - dental and gum disease
 - genitourinary thrush.
- ① In some cases, these may be the presenting features that lead to the diagnosis of diabetes.
- ① Infections tend to be more frequent among people with diabetes.

Effects on diabetes - 1

- ① Infections can develop rapidly without warning and may cause major disruption of blood glucose control.
- ① Rapid rises in blood glucose levels can occur during moderate or severe acute illnesses.
- ① Prompt detection and treatment of the intercurrent illness is a priority of care action



Effects on diabetes - 2

- ① Infection and pain lead to the production of substances (cortisol and adrenaline during a 'stress' responses) that can raise blood glucose levels.
- ① Hyperglycemia can cause dehydration, impaired kidney function and electrolyte imbalances, which may be made worse by fever or vomiting.
- ① Uncontrolled diabetes causes failure of immune defenses leading to more severe infections.

Effects on diabetes - 3

- ⊙ High blood glucose levels are associated with worse outcomes following major illnesses or operations.
- ⊙ People with diabetes are more likely to need surgery, partly because of the higher risk of coronary artery disease, peripheral vascular disease and stroke.
- ⊙ Diabetes is a risk factor for longer stays in intensive care, prolonged hospital stay and complications after surgery.



Effects on diabetes - 4

- ① Intercurrent illness can occasionally result in hypoglycaemia. This can occur if insulin or a sulphonylurea is continued when the patient is unable to take in enough carbohydrate from the diet.
- ① However, it is much more common for intercurrent illness to require a temporary *increase* in glucose-lowering medication rather than a decrease.
- ① **Remember:** glucose levels can rise even if someone is not eating!
- ① Managing intercurrent illness in someone with diabetes is sometimes guided by ‘**sick-day**’ rules.
- ① You should discuss what is meant by ‘sick-day’ rules with your local team of health professionals.

Effects on diabetes - 5

- ⊙ Problems may arise if insulin doses are reduced or omitted for fear of causing hypoglycaemia in an ill patient who is not eating normally.
- ⊙ In this situation, rising blood glucose levels indicate the need for more insulin to counter the adverse metabolic effects of the illness
- ⊙ During an intercurrent illness in a resident with diabetes, always discuss initial management with an experienced member of staff and/or a health professional

Insulin and Intercurrent Illness

- ① A reduction in insulin can disrupt metabolism leading to dangerous conditions such as hyperosmolar hyperglycaemic state (**HHS**) or diabetic ketoacidosis (**DKA**).
- ① More frequent blood glucose monitoring and an agreed treatment plan (with a healthcare professional) is essential when changes in insulin dosing and timing are being considered during intercurrent illness.
- ① In some situations, effective care in the care home can become difficult to manage without admission to hospital.

Metformin and Intercurrent Illness

- © Metformin should be discontinued in residents with diabetes with a severe intercurrent illness including Covid-19, particularly if there is evidence of impaired kidney function, low blood oxygen levels, or a fever (covid-19).



SGLT-2 inhibitors and Intercurrent Illness

- ◎ The use of SGLT-2 inhibitors (e.g. canagliflozin, empagliflozin) has been associated with an increased risk of diabetic ketoacidosis (DKA) during a number of circumstances including intercurrent illness.
- ◎ As a consequence, a decision to temporarily stop an SGLT-2 inhibitor in a resident with diabetes during an intercurrent illness needs to be taken by a diabetes specialist nurse and/or a doctor (GP).
- ◎ Care staff in care homes must learn how to measure urine and blood ketone levels (see Module A, section 4) as these measures can alert you to the development of ketoacidosis.
- ◎ **Remember:** when a resident with diabetes is unwell, you should start testing for ketones once glucose levels are 11 mmol/l or above.

An Initial Key Step in Managing moderate to severe intercurrent illness

- ① If a resident with diabetes becomes severely unwell, inform your care home manager, a registered nurse and/or doctor (GP)
- ① Ask for a review of the resident's health status
- ① Ensure you have a complete record of blood glucose tests and a list of prescribed medications to discuss with them.



Management of Frequent Clinical Problems

Common Causes

Infections (e.g. urogenital, skin, covid-19)

Vascular events (e.g. myocardial infarction)

Surgical procedures (emergency and elective)

Consequences

Dehydration

Hyperglycaemia

Ketosis

Electrolyte disturbances

Kidney impairment

Management

Close monitoring of blood glucose, urine (glucose and ketones)

Institute Sick Day Rules

Continue glucose-lowering medication (unless concern about risk of hypoglycaemia)

Consider need to increase glucose-lowering medication

Insulin may be required temporarily

Discontinue metformin and SGLT-2 inhibitors if moderate-severe infection, dehydration or hypoxia is present

Management steps in diabetes care during intercurrent illness in a care home resident

In an acutely unwell patient with diabetes the following should be closely monitored:

- ⊙ Check blood glucose levels every 2-4 hours, including during the night
- ⊙ Monitor fluid balance and vital signs, including level of consciousness
- ⊙ Continue oral fluids wherever possible
- ⊙ Report any unusual changes in blood glucose levels – there may be a need for additional therapy
- ⊙ Test urine ketones in acutely unwell diabetic patients. If ketones are present, seek medical advice
- ⊙ **Please ensure that all management has been discussed at the beginning and at regular intervals with a diabetes specialist nurse and/or a GP**

Management of diabetes during intercurrent illness

- No specific care home diabetes guidance is available that deals with managing intercurrent illness in care home residents with diabetes apart from the recent Covid-19 Response Action document referenced in Module B (4) - Hyperglycaemia
- However, the adjacent figure from Diabetes UK **“End of Life Care Guidance (2018)”** describes sick day rules for type 1 and 2 diabetes with different combinations of glucose-lowering medications
- Available at:
https://www.diabetes.org.uk/resources-s3/2018-03/EoL_Guidance_2018_Final.pdf

A Guide for Healthcare Professionals

Sick Day Management for End of Life Diabetes Care (HCP)

A number of common precautions are often necessary to reduce the development of acute metabolic complications in people with diabetes during the last year of life - Specific advice on treatment food intake and diabetes medication is provided in this leaflet, for Healthcare Professionals use only

Type 2 Diabetes: Specific Advice

| 1. Patients with Type 2 Diabetes on diet alone or tablets that are not sulphonylureas or prandial regulators | 2. Patients with Type 2 diabetes on a sulphonylurea, prandial regulator and/or insulin |
|---|---|
| <ul style="list-style-type: none">• Encourage the individual to take small sips of fluid regularly. (aim for 100ml per hour)• Offer frequent small portions of easily digested foods or fluids e.g. soup, ice cream, milky drinks• Observe for signs and symptoms of hyperglycaemia and dehydration• Only check capillary blood glucose to confirm hyperglycaemia: aim to maintain blood glucose at 15mmol/l or less• Consider stopping Metformin and or an SGLT2 if the patient has sickness/diarrhoea | <ul style="list-style-type: none">• Check blood glucose only to confirm symptoms of hyperglycaemia or hypoglycaemia• Offer frequent small easily digested carbohydrate foods to replace meals if unable to eat normally. Offer sips of sugar-free fluids, aiming for 100mls over an hour• Consider increasing diabetes medications (if blood glucose levels above 15mmol/l) or reducing diabetes medication (if blood glucose levels less than 6mmol/l)• Diabetes treatment may be discontinued if the patient is NOT eating and blood glucose level is less than 15mmol/l and patient is symptom-free |



Type 1 Diabetes: Specific Advice

| Patients with Type1 Diabetes on insulin treatment appropriate measures include: |
|---|
| <ul style="list-style-type: none">• Encourage the patient to sip sugar-free fluids regularly (aim for 100ml per hour)• If unable to eat usual meals, offer frequent small portions of easily digested foods or fluids e.g. soup, ice cream, milky drinks• Test for urine or blood ketones if patient has symptoms of hyperglycaemia and dehydration• If ketones are present, test blood glucose and ketones 2 hourly:- continue usual insulin regimen (e.g. long-acting insulin daily) but add an additional 10% of current total average daily insulin dose as fast short-acting insulin (e.g. Actrapid, Apidra, Fiasp, Humulin S NovoRapid) every 2 hours if ++ or greater on urine ketone strip or greater than 1.5mmol on blood ketone test. *• If ketone levels do not improve, and the patient is vomiting, admit to hospital for intravenous insulin and rehydration |



* If this advice is not practical for those working in a community setting please contact the hospital team for advice

Other management aspects of diabetes during intercurrent illness

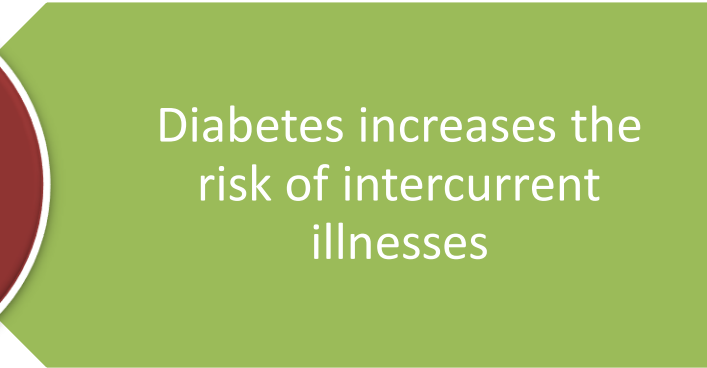
It may be necessary to admit a resident to hospital if circumstances worsen for example:

- ① If they can't swallow or keep fluids down
- ① If they have persistent vomiting
- ① If they have persistent high blood sugar levels
- ① If they have persistent increasing levels of ketones
- ① If abdominal pain or breathlessness are present

Key messages



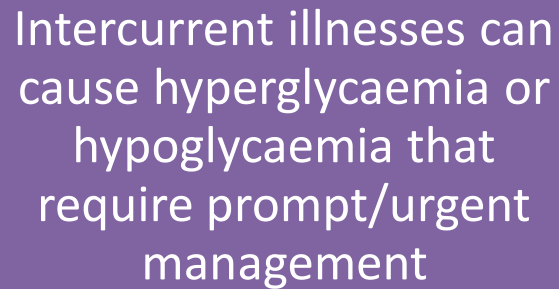
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Diabetes increases the risk of intercurrent illnesses



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Intercurrent illnesses can cause hyperglycaemia or hypoglycaemia that require prompt/urgent management

Further reading

- © Sick-Day Rules for Managing Diabetes:
<http://www.diabetesforecast.org/2013/oct/sick-day-rules-for-managing-diabetes.html>
- © Ketones and diabetes. Diabetes UK. Available at: <https://www.diabetes.org.uk/guide-to-diabetes/managing-your-diabetes/ketones-and-diabetes>

Questions

Q1. What is an intercurrent illness?

- A. A worsening of the symptoms of diabetes
- B. A break in the symptoms of diabetes
- C. The occurrence of a disease during the progress of another disease

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- A. Migraine headaches
- B. Thrush
- C. Foot ulcers

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Q3. How should someone with diabetes and an intercurrent illness manage their diabetes medication?

- A. Stop taking their diabetes medication
- B. Continue their diabetes medication, and take prompt advice from a registered doctor or nurse

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Q4. When should you seek medical advice?

- A. When a resident shows signs of infection
- B. When a resident shows signs of dehydration
- C. When a resident shows signs of confusion
- D. All of the above

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Questions

Q5. What are 'sick-day rules' ?

- ⊙ A. Rules that govern which medicines should be stopped when a resident with diabetes becomes ill
- ⊙ B. Specific advice for carers on what medicines should be given to an unwell resident with diabetes
- ⊙ C. Specific advice on nutritional and medicines management for health professionals when a resident becomes unwell in order to prevent medical and metabolic complications

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Learning completed