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TRAINING, RESEARCH AND EDUCATION
FOR NURSES IN DIABETES

Sick day rules

Jill Hill

Co-chair TREND-UK



Disclosures

- I have received payment for articles, presentations and involvement on advisory boards for all the major pharmaceutical companies who support diabetes



What will this session cover?

- How does illness affects blood glucose levels and why?
- General sick day rules
- What to monitor during illness and how often
- Simple advice about adjustment of tablets and insulin
- Some meal replacements for people unable to eat normally
- When to advise the individual to seek urgent medical help



How does illness affect blood glucose levels?

- Stress and counter-regulatory hormones increase blood glucose levels as part of the mechanism to fight infection. Insulin is needed to utilise this (French et al, 2019)
- Risk of infection is increased in people with diabetes especially bone and joint infections, sepsis and cellulitis (Carey et al 2018)
- The effect of illness and its management will depend on:
 - Type of diabetes
 - Type of illness
 - Type of treatment



Acute diabetes complications associated with intercurrent illness

- Dehydration from osmotic diuresis
- Diabetic ketoacidosis (DKA)
 - More common in type 1 diabetes
 - Rapid onset. Mortality < 1%
 - Blood ketones 3 mmol/L or greater, BG >11 mmol/L, venous pH <7.3
- Hyperosmolar Hyperglycaemic State (HHS)
 - Typically elderly with co-existing co-morbidities
 - High mortality (10-20%)
 - BG > 30 mmol/L but < ketones 3mmol/L
 - Osmolality >320
 - (JBDS 2013, 2012)



General sick day rules: aim is to maintain reasonable BG control, avoid dehydration and unplanned hospital admission

- Rest- avoid strenuous exercise
- Monitor BG (and ketones if type 1 diabetes)
- Fluids- 2.5 to 3.5 litres (4 to 6 pints) over 24 hours
- Meal replacements if not eating
- Treat symptoms- e.g. cough syrup
- See GP for antibiotics if an infection
- Adjust insulin



What to monitor and how often?

- Depends on type of diabetes and treatment
- People with type 1 diabetes should have blood ketone strips and know how to interpret the results
- **All** people with diabetes who are unwell and vomiting should have blood ketones checked
- If using insulin, test at least 4 times daily (at mealtimes even if not eating, and at bedtime)
- Type 1 diabetes with ketones need to test 2 hourly to guide extra insulin doses



Ketone testing

- <0.6 mmol/L: normal
- 0.6 - 1.5 mmol/L: Risk of DKA. Re-test in 2 hours
- 1.6 - 2.9 mmol/L: Test 2 hourly and give 10% of total daily insulin given as a quick-acting insulin 2 hourly
- 3 mmol/L: High risk of DKA. Needs 20% of total daily insulin given as a quick-acting insulin 2 hourly

- No improvement or starts to vomit: hospitalisation

Simple advice for adjusting insulin

- If the blood glucose is persistently > 11 mmol/L:
 - 11.1 to 17 mmol/L: add 2 extra units to every dose
 - 17.1 to 22 mmol/L: add 4 extra units to every dose
 - Over 22 mmol/L: add extra 6 units to every dose
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- If usual total daily dose is over 50 units, double these amounts
 - Reduce insulin as blood glucose levels improve
 - (More comprehensive algorithms are available for people with type 1 diabetes)

People with type 1 diabetes or
long-standing type 2 diabetes:
never stop insulin completely
even if not eating!



Other medications

- Continue medications as usual but:
 - Metformin: dehydration and acute reduction in renal function = risk of lactic acidosis
 - SGLT2 inhibitor: DKA risk in certain circumstances
 - Acute abdominal pain- acute pancreatitis?
 - GLP-1 receptor agonists and insulin- DKA concerns when insulin reduced too rapidly or stopped



Meal replacements if unable to eat usual meals

- Being ill consumes calories
- Starvation and dehydration increases risk of ketone development
- The following are 10g carbohydrate, equivalent to a small potato, or 1 tbs of cooked rice or pasta
- Fruit juice: 100ml
- Milk: 200ml
- Ice-cream: 1 large scoop
- Yoghurt: small 150g pot
- Tomato soup: ½ large can
- Rich tea or malted milk biscuits: 2



When to seek urgent medical attention:

- Pregnancy and type 1 diabetes
- Persistent vomiting and unable to retain fluids
- If blood ketones are 1.6 mmol/L or greater and unsure how to treat
- If drowsy, breathless, confused
- Acute abdominal pain
- Unable to keep BG >3.5 mmol/L



Useful resources:

- For people with diabetes:
 - Type 1 diabetes: What to do when you are ill
 - Type 2 diabetes: What to do when you are ill
- For healthcare professionals:
 - Managing diabetes during intercurrent illness in the community
- www.trend-uk.org/resources



References:

Carey IM et al (2018) Risk of infection in Type 1 and Type 2 diabetes compared with the general population: a matched cohort study. *Diabetes Care* 41 (3): 513-521

French EK, Donihi AC, Korytkowski MT (2019) Diabetic ketoacidosis and hyperosmolar hyperglycaemic syndrome: review of acute decompensated diabetes in adults available at <https://www.bmj.com/content/365/bmj.l1114>

JBDS-IPCG (2012) Joint British Diabetes Societies Inpatient Care Group. The management of the hyperosmolar hyperglycaemic state (HHS) in adults with diabetes available at https://abcd.care/sites/abcd.care/files/resources/JBDS_IP_HHS_Adults.pdf

JBDS-IPCG (2013) Joint British Diabetes Societies Inpatient Care Group. The Management of Diabetic Ketoacidosis in Adults available at https://abcd.care/sites/abcd.care/files/resources/2013_09_JBDS_IP_DKA_Adults_Revised.pdf



