COncise adVice on Inpatient Diabetes (COVID:Diabetes): FRONT DOOR GUIDANCE - UPDATE

DIABETES UK
KNOW DIABETES. FIGHT DIABETES.

JBDS Joint British Diabetes Societies for inpatient care

ABCD

NATIONAL INPATIENT DIABETES COVID-19 RESPONSE GROUP*

⚠ COVID-19 infection in people with or without previously recognised diabetes increases the risk of the EMERGENCY states of hyperglycaemia with ketones, Diabetic KetoAcidosis (DKA) and Hyperosmolar Hyperglycaemic State (HHS)

Being acutely unwell with suspected/confirmed COVID-19 requires adjustment to standard approaches to diabetes management (see table below).

The guidance in this document is an update from that based on initial experience from UK centres, now confirmed by subsequent world wide experience. It will continue to be updated as more evidence becomes available.

WHERE CHANGE SEEN	KEY DIFFERENCE WITH COVID-19	SUGGESTED ACTION
Early in admission	**People with COVID-19 infection are at greater risk of hyperglycaemia with ketones** including: › People with type 2 diabetes (risk even greater if on a SGLT-2 inhibitor) › People with newly diagnosed diabetes **COVID-19 disease** precipitates **atypical presentations of diabetes emergencies (eg, mixed DKA and hyperosmolar states)**	› Check blood glucose in everybody on admission › Check ketones in: » everybody with diabetes being admitted » everybody with an admission glucose over 12 mmol/l › Stop SGLT-2 inhibitors in all people admitted to hospital › Stop Metformin in all people admitted to hospital **but** after satisfactory review of blood lactate, renal and hypoxic status recommence as recent data suggests that metformin may reduce progress to severe COVID-19 disease. › Consider using 10-20% glucose where ketosis persists despite treatment in line with usual protocols
Severe illness on admission	**Fluid requirements may differ** in those with **DKA/HHS and evidence of "lung leak", myocarditis or AKI**	› **After restoring the circulating volume the rate of fluid replacement** regimen may need to be adjusted where evidence of **"lung leak", myocarditis or AKI** › **Contact the diabetes specialist team early** › Early involvement of the critical care team › Careful assessment of fluid balance
All inpatient areas	**Infusion pumps may not be available to manage hyperglycaemia using intravenous insulin** as these are required elsewhere (eg for sedation in ICU)	› Use alternative **s/c regimens** to manage » **Hyperglycaemia** » **Mild DKA** › **Contact the diabetes specialist team** for support
ICU	**Significant insulin resistance** seen in people with **type 2 diabetes in ICU settings**	› **IV insulin protocols may need amending** (people seen requiring up to 20 units/hr) › Patients often nursed prone so feeding may be accidentally interrupted – **paradoxical risk of hypoglycaemia**

CONCISE ADVICE ON INPATIENT DIABETES (COVID:Diabetes): **GUIDANCE**

COVID-19 infection in people with or without previously recognised diabetes increases the risk of the EMERGENCY states of hyperglycaemia with ketones, Diabetic KetoAcidosis (DKA) and Hyperosmolar Hyperglycaemic State (HHS)

Management of Acute Diabetes at the Front Door for Emergency Departments & Acute Medical Units

Patient Assessment: ABCDE

⚠ **NOTE: Shortness of Breath can also be due to METABOLIC Acidosis (e.g DKA)**

Ensure **ALL** newly admitted patients are **evaluated for diabetes**

GLUCOSE measurement in ALL patients and KETONE check if known diabetes or blood glucose level above 12mmol/L

⚠ **STOP- SGLT-2 inhibitor (Cana-/Dapa-/Empa or Ertu-gliflozin)**

⚠ **STOP- Metformin in ALL patients BUT restart depending on satisfactory blood lactate levels and renal and hypoxic status as recent data suggests that metformin may reduce progress to severe COVID-19 disease**

ACE-inhibitors and ARBs do not worsen COVID-19 disease but their use and the use of NSAID must be reviewed in the individual clinical context

Blood GLUCOSE Level Advice (Known OR Unknown diabetes)

Glucose < 4mmol/L = HYPOGLYCAEMIA FOLLOW LOCAL GUIDELINES

Glucose ≥ 12mmol/L or known diabetes

Primary diagnoses to **URGENTLY** consider:

- **DKA** (defined as glucose >11mmol/L or history of diabetes, blood ketones ≥ 3mmol/L or urine ketones ≥ +2 and pH <7.3 or bicarbonate <15). **Note: glucose can be normal in SGLT-2 inhibitor associated DKA & pregnancy associated DKA**
- **HHS** (defined as glucose ≥ 30mmol/L, Serum Osmolality ([(2 x Na) + glucose + urea] > 320mOsm/kg and pH > 7.3)

Follow local guidelines if either of above is confirmed and involve diabetes team as soon as possible, as changes to usual fluid replacement regimen may be necessary

⚠ **NOTE: NEVER STOP BASAL INSULIN IN PERSON WITH KNOWN TYPE 1 DIABETES OR DKA MAY RESULT**

Other **URGENT** causes of hyperglycaemia to consider:

- **New presentation of diabetes** (type 1 or 2 -age/weight irrelevant for either)
- **SEPSIS** (e.g. COVID-19 or foot infection)
- Missed/delayed usual diabetes treatment (e.g. insulin pen or personal insulin pump problem)
- Reflection of uncontrolled diabetes/inappropriate treatment regimen (recent HbA1c available?)
- Oral steroid use

Persistently high glucose levels may need treatment with subcutaneous or intravenous insulin

If an infusion pump is not available for IV **insulin** then seek advice regarding an alternative subcutaneous regimen.

In all cases, if unsure please seek diabetes team guidance as early as possible or follow local protocols

FURTHER ADVICE ON NEXT PAGE:

BLOOD KETONE LEVEL

INSULIN ADVICE

WEARABLE DIABETES TECHNOLOGY

FOOT NOTES

FURTHER ADVICE ON INPATIENT DIABETES (COVID:Diabetes):

BLOOD KETONE LEVEL ADVICE:

Blood ketones less than 0.6 mmol/L = SAFE level

Blood ketones 1.5 – 2.9mmol/L = **INCREASED DKA RISK**

- PO or IV fluids
- Consider rapid acting insulin if glucose above 16mmol/L - 1 unit rapid acting insulin 'typically' expected to lower glucose by anywhere between 1-3mmol/L. Recheck in 2 hours.

Blood ketones 3mmol/L or greater then check pH and bicarbonate (venous blood gas). DKA confirmed if high ketones accompanied by:

- Blood glucose > 11 mmol/L (or history of diabetes) and
- pH < 7.3 or bicarbonate <15

⚠ NOTE: Glucose can be <11mmol/L if patients are on SGLT-2 inhibitor treatment, pregnant AND/OR severe COVID-19 infection

INSULIN ADVICE – ALWAYS ASK IF YOUR PATIENT IS ON INSULIN

- **ALWAYS CONTINUE USUAL LONG ACTING BASAL INSULIN**
- Patients who are very sick or not eating should have a Variable Rate Intravenous Insulin Infusion (VRIII/'sliding scale'), with usual basal subcutaneous (SC) insulin continued alongside
- If an infusion pump is not available for IV insulin, contact diabetes team or follow local protocols for an alternative subcutaneous regimen

PATIENTS USING WEARABLE DIABETES TECHNOLOGY

- If patients are unable to manage their personal insulin pump and no specialist advice is immediately available, start a VRIII or S/C basal-bolus insulin regimen then remove the pump and store it safely. If S/C regime required and not able to find out total daily insulin dose from pump then the following would be safe: calculate total daily insulin dose using 0.5 units/kg and give half the total dose as basal/background insulin and half as bolus/mealtime rapid acting insulin. Example, 0.5 units x 60 kg = total daily insulin dose of 30 units. Give half dose (15 units) as basal insulin and 15 units as bolus insulin (5 units at each meal-time). Ensure that pump is disconnected AFTER S/C basal insulin given.
- Continuous glucose monitors (CGM) and Freestyle Libre (FSL) devices can be left on the patient but conventional capillary glucose monitoring will still be necessary
- For imaging, insulin pumps, Continuous Glucose Monitors (CGM) and FreeStyle Libre (FSL) devices need to be removed for magnetic scans such as MRI

FOOTNOTES

- ALWAYS need to exclude acute foot infection (may be the source of sepsis) or critical limb ischaemia
- ALWAYS ensure foot intact and protected

⚠ TAKE ACTION ON ACUTE FOOT DISEASE AS PER LOCAL DIABETIC FOOT PROTOCOLS

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