

Management of Diabetic Ketoacidosis (DKA) and/or Hyperosmolar Hyperglycaemic State (HHS) in confirmed/suspected* Covid-19 patients in adults

**High clinical suspicion for Covid-19 according to Trust guidelines while awaiting swab results or despite negative swab results (Use standard DKA/HHS guidelines if low clinical suspicion)*

This guideline was developed as part of the Trust response to the Covid-19 pandemic and will be kept under review in light of any changes to emerging evidence or national guidance

- Adapted from Guy's and St Thomas' NHS Foundation Trust DKA/HHS Covid guideline
- Please also refer to Trust guidelines on standard DKA/HHS for other aspects of management
- See also Diabetes UK COVID:Diabetes Front Door Guidance

DKA in confirmed/suspected Covid-19 patients

If haemodynamically unstable (SBP < 100mmHg), give 500ml 0.9% sodium chloride bolus over 15 mins and contact ICU/CCOR team. You can repeat the bolus twice.

- Covid-19 +ve patients are more likely to develop ketosis
- The effect of Covid-19 +ve infection on potassium regulation remains unknown, therefore we recommend **monitoring potassium 2-hourly** and replacement should follow the standard DKA protocol
- In Covid-19 related lung damage, usual DKA fluid replacement risks over replacing and subsequent pulmonary oedema
- Therefore, we recommend more cautious fluid replacement over 72 hours with less front-loading
- **We recommend monitoring fluid replacement hourly in the first 12 hours**
- Urine output and BP should be key parameters to assessing fluid status
- **Discuss with a senior clinician about increasing the rate of fluid replacement if the current rate does not appear to be resuscitating adequately**
- If weight is not available, use the fluid replacement rates for the 70-80kg range

Weight (kg)	Rate of 0.9% sodium chloride (mls/hr)	
	pH ≤ 7.1	pH > 7.1
< 50	100	90
50 – 60	115	100
60 – 70	130	115
70 – 80	140	125
80 – 90	150	135
90 – 100	165	145
> 100	170	155

- Insulin infusion rates should follow the standard DKA protocol (see standard DKA Trust guidelines on Intranet)
- If known T1DM, **ensure usual long acting basal subcutaneous insulin is always continued**
- If newly diagnosed T1DM not previously on insulin, commence Semglee OD morning or bedtime (Semglee is 1st line analogue basal insulin at CHFT; if unavailable, use any of Abasaglar, Lantus or Levemir whichever is available)
Suggested starting dose:
 - 8 units if weight < 70kg
 - 12 units if weight > 70kg

HHS or mixed HHS/DKA in confirmed/suspected Covid-19 patients

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- The effect of Covid-19 +ve infection on potassium regulation remains unknown, therefore we recommend **monitoring potassium 2-hourly** and replacement should follow the standard HHS protocol
- In Covid-19 related lung damage, usual HHS fluid replacement risks over replacing and subsequent pulmonary oedema
- Therefore, we recommend more cautious fluid replacement over 72 hours with less front-loading
- **We recommend monitoring fluid replacement hourly in the first 12 hours**
- Urine output and BP should be key parameters to assessing fluid status
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- If weight is not available, use the fluid replacement rates for the 70-80kg range

Weight (kg)	Rate of 0.9% sodium chloride (mls/hr)	
	"BM" 30-50 mmol/L	"BM" > 50 mmol/L
< 50	100	110
50 – 60	115	125
60 – 70	130	140
70 – 80	140	155
80 – 90	150	170
90 – 100	165	185
> 100	180	200

- Insulin infusion rates should start at 2 units/hr (Note this is different to the standard HHS protocol)
- If usually on a long acting basal insulin, ensure this is always continued
- Increase insulin infusion rate by 1 unit/hr if:
 - Blood glucose "BM" falls by less than 5mmol/L per hour
 - Blood ketone falls by less than 0.5mmol/L per hour
- Continue to a maximum of 7 units/hr – if "BM" or blood ketone rate of fall are still not achieved, seek senior advice or contact Diabetologist
- Decrease insulin infusion rate by 1 unit/hr if "BM" falling by more than 10mmol/hr (**Glucose should not be falling this quickly**)
- See also standard HHS Trust guidelines on Intranet

Switching from intravenous insulin to subcutaneous insulin

Consider switching when ketones < 1mmol/L, pH > 7.3 and patient is eating and drinking

- If patient was previously on insulin, restart usual insulin doses
- For T1DM on basal bolus insulin, ensure usual long acting basal insulin had been given, and give usual quick acting bolus insulin at mealtime then stop intravenous insulin one hour after
- If newly diagnosed T1DM not previously on insulin, ensure a long acting basal insulin had been given (see above), and commence Humalog or Novorapid 4 to 6 units at mealtime then stop intravenous insulin one hour after
- If usually on mixed insulin (2 or 3 times daily with meals), give usual dose at mealtime then stop intravenous insulin one hour after
- For T2DM usually on only oral tablets/GLP1 analogues ± basal insulin, or newly diagnosed T2DM, it is safer to manage glycaemic control with subcutaneous insulin during Covid-19
 - If on basal insulin, ensure this had been given (see above), and commence Humalog or Novorapid 0.1 units/kg at mealtime then stop intravenous insulin one hour after
 - If not previously on insulin, commence Humulin M3 twice daily
Start with total daily dose of 0.5 units/kg – split 2/3 breakfast and 1/3 evening meal

Refer to Diabetes specialist team for ongoing management