

HYPERGLYCAEMIA PROTOCOL

BASAL BOLUS INSULIN

CHART

(ADULT) – MR62A

Hospital: QUIET CREEK

Affix patient identification label in this box

UR No: 012345

Surname: FRANKLIN

Given Name: LOUISE

Second Given Name: ANNE

D.O.B: 01/01/1972

Sex: F

Purpose

The CHSA Hyperglycaemia Protocol and Basal Bolus Insulin (BBI) Chart (MR62A) will assist patients with type 1 diabetes or type 2 diabetes with high blood glucose (BG) or anticipated high BG during hospitalisation.

BBI refers to a combination of basal insulin and bolus mealtime insulin with correctional insulin given at meal times. BBI aims to mimic normal insulin secretion. BBI offers better BG control than sliding scale insulin (SSI) as it aims to prevent the BG rising (rather than only treating the BG when high). It is not associated with increased hypoglycaemia (when compared with SSI).

Inpatients with diabetes who will benefit from this protocol are those who have an anticipated length of stay greater than 48 hours and:

- have current hyperglycaemia where current diabetes therapy is insufficient (e.g. more than one BG greater than 10.0mmol/L within a 24 hour period).
- have anticipated hyperglycaemia where current diabetes therapy is unlikely to be sufficient (e.g. more than one BG greater than 10.0mmol/L within a 24 hour period post operatively).
- are transitioning from an IV insulin infusion.
- obstetric patients – for Country Health SA Birth Sites – requires management of care by specialist obstetrician, specialist physician and/or endocrinologist.

The protocol is not to be used in inpatients:

- who have an anticipated length of stay less than 48 hours.
- with BG in target on their usual diabetes medication (e.g. oral and/or injectable).
- with Diabetic Ketoacidosis (DKA) – refer to the CHSA DKA/Type 1 Protocol (MR-INF-A).
- with Hyperglycaemic Hyperosmolar state (HHS) – refer to the CHSA HHS/Type 2 Protocol (MR-INF-B).
- in labour
- in the paediatric or residential aged care setting – consultation must be sought from the paediatrician, specialist physician and/or endocrinologist.

Blood glucose target

The blood glucose (BG) target range for patients with diabetes on general wards is **5.0-10.0mmol/L**. There may be circumstances where the BG target needs to be modified.

Modified blood glucose targets (please circle if required)

Obstetric: 4.1 – 7.9mmol/L

Other: - mmol/L

Blood glucose monitoring instructions

- Test blood glucose (BG) according to frequency instructions
- Place a dot (.) in the centre of the box which refers to the BG level and connect dots with a straight line. Record BG number in line below the graph.
- Initiate actions according to colour zone.
- Treat all BG levels less than 4.0mmol/L using the CHSA Hypoglycaemia Protocol.

Blood ketone monitoring instructions

Blood ketones are a sign of insulin deficiency and risk of DKA. Ketones can occur in low or 'in target' blood glucose levels.

- Test blood ketones according to frequency instruction.
- Record blood ketones result in line below the graph.
- Initiate actions according to colour zone.

Interventions or Review			
Record intervention below and note corresponding letter in intervention row below graph		Initial	Designation
A	Notified GP - no change in treatment	BG	RN
B			
C			
D			
E			
F			
G			

Steps to Initiate Hyperglycaemia Protocol and Basal Bolus Insulin Chart

Step 1

Cease all regular current diabetes treatment. Review/Measure HbA1c to assess pre admission diabetes control.

HbA1c 8.2 % 66 mmol/mol

Date 15/3/19

Step 2

Using the table below, calculate the Total Daily Insulin (TDD) requirements using the patient's weight and current diabetes medication (e.g. oral/injectable* agents or subcutaneous insulin).

Current diabetes treatment	Total initial daily insulin dose
Diet	0.3 units/kg
Oral/injectable agents*	0.4 units/kg
Subcutaneous insulin	Insulin used in last 24 hours
S/C insulin + oral /injectable agents*	Insulin used in last 24 hours + 10%
Intravenous infusion	Four times insulin used in last 6 hrs

* oral/injectable* agents - Metformin, Sulphonylureas, SGLT2, DPPA inhibitors, GLP1 injectables, glitazones

Step 3

Identify Insulin Requirements

a. Glargine (basal) – Write up 50% of calculated total daily insulin as the glargine (Lantus) dose.

b. Rapid insulin with meals (bolus) – 50% of the calculated total daily insulin divided into 3 equal doses of rapid acting insulin (Humalog or NovoRapid) with meals.

c. Correctional rapid insulin (bolus) – rapid acting insulin doses are standard and must be signed by the prescriber. For administration at main meal times only (e.g. with the rapid acting meal dose or alone if the patient is fasting).

Step 4

Cross reference BBI Chart on the National Inpatient Medication Chart (NIMC) by ticking the BGL/insulin box on page 1 and using 'BBI In Use' Sticker or writing 'See BBI Chart'.

Step 5

Daily Medical Review is required. Consider any clinical changes adjustments (e.g. infection is improving, appetite returning or increasing mobility), correctional insulin use or hypoglycaemia to inform insulin dose adjustments.

Step 6

Adjust Insulin Doses

The aim is for all blood glucose (BG) levels to be within target (e.g. 5.0 - 10.0mmol/L) without requiring correctional insulin.

Time BG taken	HIGH BG (greater than 10.0mmol/L)	LOW BG (less than 4.0mmol/L)
Before b/fast	Increase glargine	Decrease glargine
Before lunch	Increase b/fast rapid insulin	Decrease b/fast rapid insulin
Before tea	Increase lunch rapid insulin	Decrease lunch rapid insulin
2100 hours	Increase tea-time rapid insulin	Decrease tea-time rapid insulin

If BG out of target, cease inappropriate insulin order and prescribe a:

- Reduction in the appropriate insulin by 20-25% to prevent further hypoglycaemia (ie. BG less than 4.0mmol/L).
- Increase in the appropriate basal or meal related bolus insulin by 10-25% to address/prevent hyperglycaemia. Use the amount and pattern of correctional Insulin given in the proceeding 24-48 hours as a guide.

Step 7

BBI is management of hyperglycaemia in the inpatient setting. Ceasing BBI Chart is recommended when transferring to planned discharge therapy. Ideally, this should happen 1-2 days before discharge or when medically stable and is dependent on the patient's reason for admission and previous glycaemic control (HbA1c).

HbA1C	Consider
less than 7% (53mmol/mol)	recommence on usual diabetes treatment.
between 7- 8% (53- 64mmol/mol)	may require increase in usual therapy and arrange follow-up GP appointment.
greater than 8% (64mmol/mol)	increase in usual pre-admission treatment and arrange GP and diabetes education follow up.

Ceasing BBI Chart and transferring to planned discharge therapy of:

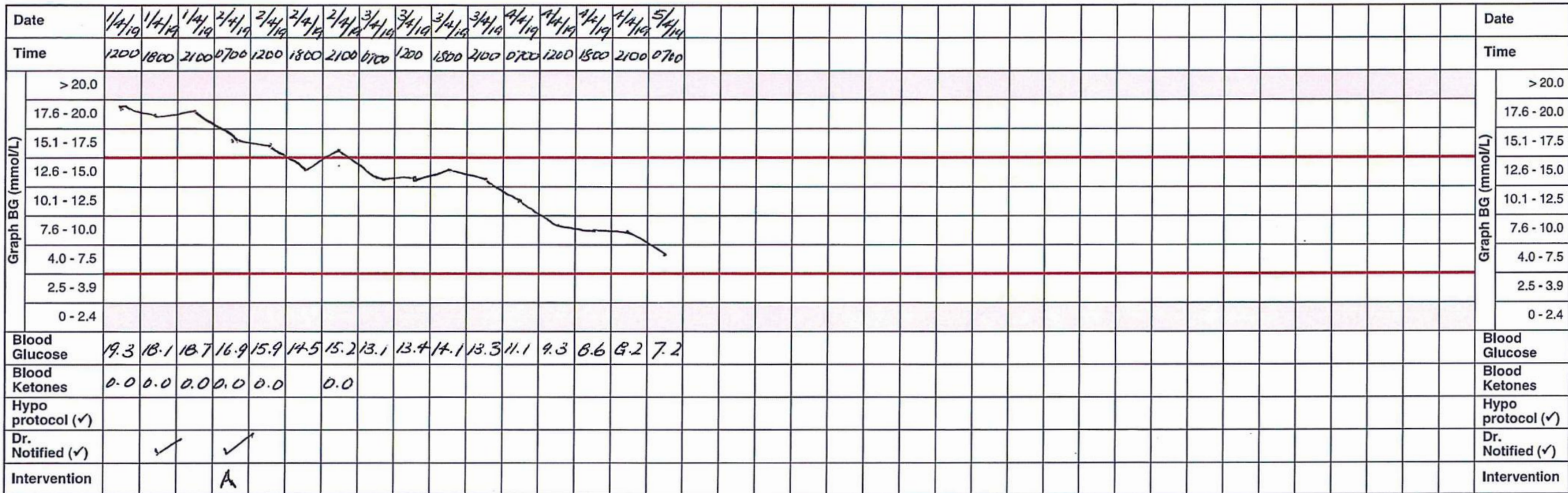
- Oral/injectable agents* without glargine (Lantus)** – reduce night time dose by 50% and give as the last dose and commence oral/injectable agents* in the morning (consider eGFR for Metformin dose).
- Glargine (Lantus) with or without other oral/injectable agents*** – administer night time dose as usual and commence oral/injectable agents* the following day.
- Alternate insulin, eg premix or morning glargine (Lantus)** – reduce night time dose by 50% and commence prescribed insulin and any oral/injectable agents* the following day.

There may be some circumstances where BBI will be required after discharge.

HYPERGLYCAEMIA PROTOCOL BASIL BOLUS INSULIN CHART MR62A

Blood glucose (BG) monitoring frequency instructions		
Routine (QID) Test all patients with diabetes before meals and at 2100hrs until review by medical practitioner.	Unstable (QID + 0200hrs) Routine times plus 0200hrs if admission for hypoglycaemia or nocturnal hypoglycaemia suspected.	Stable (BD) If not at risk of hypoglycaemia and BG is between 5.0-10.0mmol/L, consider testing before breakfast and evening meal.
Blood ketone monitoring frequency instructions (for patients on insulin)		
Routine (Daily) If the patient is fasting.	Unstable If the BG greater than 15mmol/L.	Unwell If nausea or vomiting persist, recheck blood ketones as per the RDR Instruction.

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Hospital: <u>QUIET CREEK</u>	<p>Affix patient identification label in this box</p> <p>UR No: <u>012345</u></p> <p>Surname: <u>FRANKLIN</u></p> <p>Given Name: <u>LOUISE</u></p> <p>Second Given Name: <u>ANNE</u></p> <p>D.O.B: <u>01/01/1972</u> Sex: <u>F</u></p>



RAPID INSULIN WITH MEALS (Bolus requirement)			SUBCUT		HOLD DOSE IF FASTING				
Circle preferred rapid insulin Novorapid / Humalog			Administer immediately before or with meals						
B'fast	Lunch	Tea	DATE	1/4/19	2/4/19	3/4/19	4/4/19	5/4/19	6/4/19
6	6	6	Name	DR V NHO	0700	6	3	3	1
Units	Units	Units	Sign	DR V NHO	1200	6	3	3	1
Units	Units	Units	Date	1/4/19	2/4/19	3/4/19	4/4/19	5/4/19	6/4/19
Units	Units	Units	Design	GP	GP	GP	GP	GP	GP
B'fast	Lunch	Tea	Name	DR V NHO	0700	6	3	3	1
Units	Units	Units	Sign	DR V NHO	1200	6	3	3	1
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Units	Units	Units	Design	GP	GP	GP	GP	GP	GP
B'fast	Lunch	Tea	Name		B'fast				
Units	Units	Units	Sign		Lunch				
Units	Units	Units	Date		Tea				
Units	Units	Units	Design						

CORRECTIONAL RAPID INSULIN		SUBCUT		GIVE THIS DOSE AT MAIN MEAL TIMES EVEN IF FASTING				
Only needed if BGL > 10 mmol/L. If a correctional dose is required, use the same type of rapid insulin as above. This dose can be combined with the above rapid insulin dose for administration.								
BG (mmol/L)	INSULIN	DATE	1/4/19	2/4/19	3/4/19	4/4/19	5/4/19	6/4/19
< 10.0	none	Name	DR V NHO	0700	6	3	3	1
10.1 - 15.0	3 units	Sign	DR V NHO	1200	6	3	3	1
> 15.0	6 units	Date	1/4/19	2/4/19	3/4/19	4/4/19	5/4/19	6/4/19
		Design	GP	GP	GP	GP	GP	GP

GLARGINE (Lantus) INSULIN (Basal requirement)		SUBCUT		GIVE THIS DOSE EVEN IF FASTING	
22 units nocte	Name	DR V NHO	DATE	1/4/19	2/4/19
26 units nocte	Sign	DR V NHO	2100	3/4/19	4/4/19
28 units nocte	Date	1/4/19	2100	5/4/19	6/4/19
	Design	GP			

Rapid Detection and Response Instruction	
<p>A Senior Registered Nurse (RN) review must occur when a blood glucose (BG) or blood ketone result is in the yellow zone:</p> <ul style="list-style-type: none"> BG is less than 4.0mmol/L (refer to Hypo Protocol) BG between 10.1 - 20.0mmol/L Blood ketone between 0.1 – 0.9mmol/L <p>Review: Recheck BG and/or ketones in 2 hours.</p>	<p>A Multi-Disciplinary Team (MDT) review must occur when a blood glucose (BG) or blood ketone result is in the red zone:</p> <ul style="list-style-type: none"> BG is less than 2.5mmol/L or greater than 20.0mmol/L Two consecutive BG results are greater than 15.0mmol/L Blood ketone is greater than 1.0mmol/L <p>Review: Recheck BG and/or ketones in 1 hour or when medically ordered.</p>
<p>A Medical Emergency Response (MER) review must occur when:</p> <ul style="list-style-type: none"> Blood glucose (BG) is less than 4.0mmol/L and the patient is unconscious, unsafe to swallow or has not responded to the CHSA Hypoglycaemia Protocol oral treatment in 45 minutes. The patient is drowsy, confused, breathing rapidly or having difficulty breathing or complaining of severe abdominal pain. <p>Review: Recheck BG and/or ketones when medically ordered.</p>	