AUDIT OF PERI-OPERATIVE DIABETES CARE

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RGH PAC DIABETES PLANS

No plans previously

1 year April 2018-19

- RGH - 704 PAC plans
- 56 different staff members
  - Anaesthetists and Pre-assessment Nurses

AUDIT TOOL

Addressograph

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Aneurin Bevan University Health Board

Diabetes Recovery Audit

Please circle or tick as appropriate:

1. To what surgical speciality does the patient belong ☐

2. Is the patient: Elective ☐
   Emergency ☐

3. **If elective** does the patient have a Pre-Anaesthetic Clinic (PAC) plan :

   a. Diabetes PAC plan in the notes **Y N**
   b. Diabetes PAC plan in CWS **Y N Not Checked**

   c. If PAC plan present is it **Drug Mx VRIII**

4. Is patient following a diabetes chart
   a. Drug Management ☐
   b. VRIII ☐
   c. Not on chart ☐

5. Was a CBG done within 1 hr prior to arriving in recovery **Y N**
   a. What was the CBG ☐

6. If patient on a VRIII was it connected on arriving in recovery **Y N**

Comments or ideas;

_____

_____

SAMPLE SIZE

- 33 patients between May & June 2019 across RGH and SWH
  - 19 Orthopaedic
  - 6 General
  - 2 Vascular
  - 2 ENT
  - 1 x urology, IR, medical, trauma

- 28 Elective patients and 5 non-elective

PAC DOCUMENT IN NOTES OR CWS?

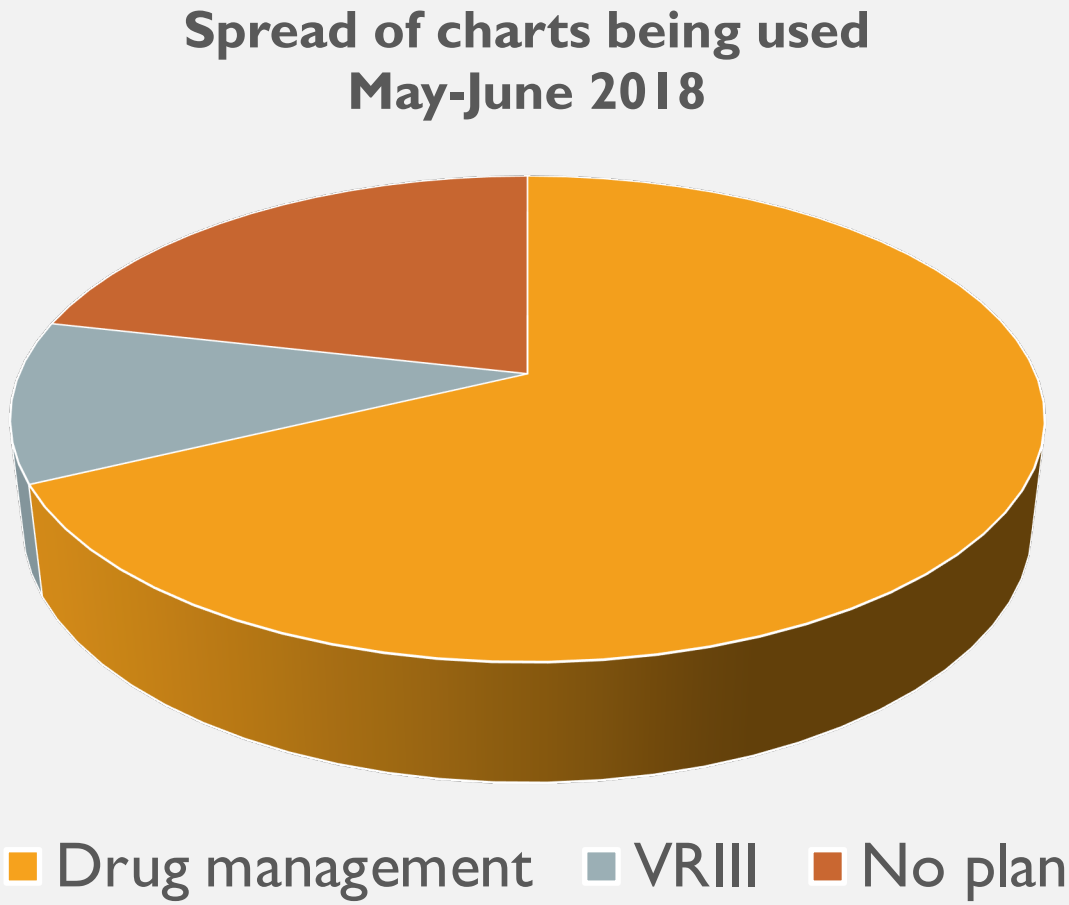
- 22/28 completed

- Missed specialities:
  - 1 x ENT
  - 1 x IR
  - 4 x Orthopaedics

80% of elective pt's had a PAC plan

OUTCOME OF PAC PLAN

- From 22 completed PAC documents:
  - 19/22 Drug Management
  - 3/22 VRIII



DRUG MX OR VRIII CHART IN NOTES ?

- Out of 33 patients: 50% of patients had charts
  - 16/33 had a appropriate chart in notes
  - 17/33 had no chart in notes

- Of the 17 with no chart:
  - 2/5 non elective patients
  - 5/6 also had no PAC document
  - From a range of specialities

50% of patients had charts

CBG WITHIN 60 MINS OF RECOVERY?

- 29/33 had CBG taken and documented within 60 mins of recovery
  - 11/29 had CBG > 8.0mmol
  - Of these 7/11 had no Diabetes chart
- 6/6 Sliding scales were connected in recovery

63% of patients with no chart had CBG > 8

RECOVERY POSTER

Diabetes Feet are at RISK

Heel support
Gel pads

VRIII chart

Doctors = 4 signatures

x2 Hypo treatment
Fluid prescription
VRIII prescription

Nurse = 2 signatures

Fluid prescription
VRIII prescription

All Peri-op Diabetes Patients (excluding diet controlled)

- CBG hourly
- All NBM patients must follow a:
  Drug Management Chart or VRIII Chart
- VRIII to be connected and running on transfer to recovery or may delay handover

Can this patient be on a Drug Mx Chart?

Easier and Safer for Patient

See: 'Quick Reference Poster'

Diabetes Feet are at RISK

Heel support
Gel pads

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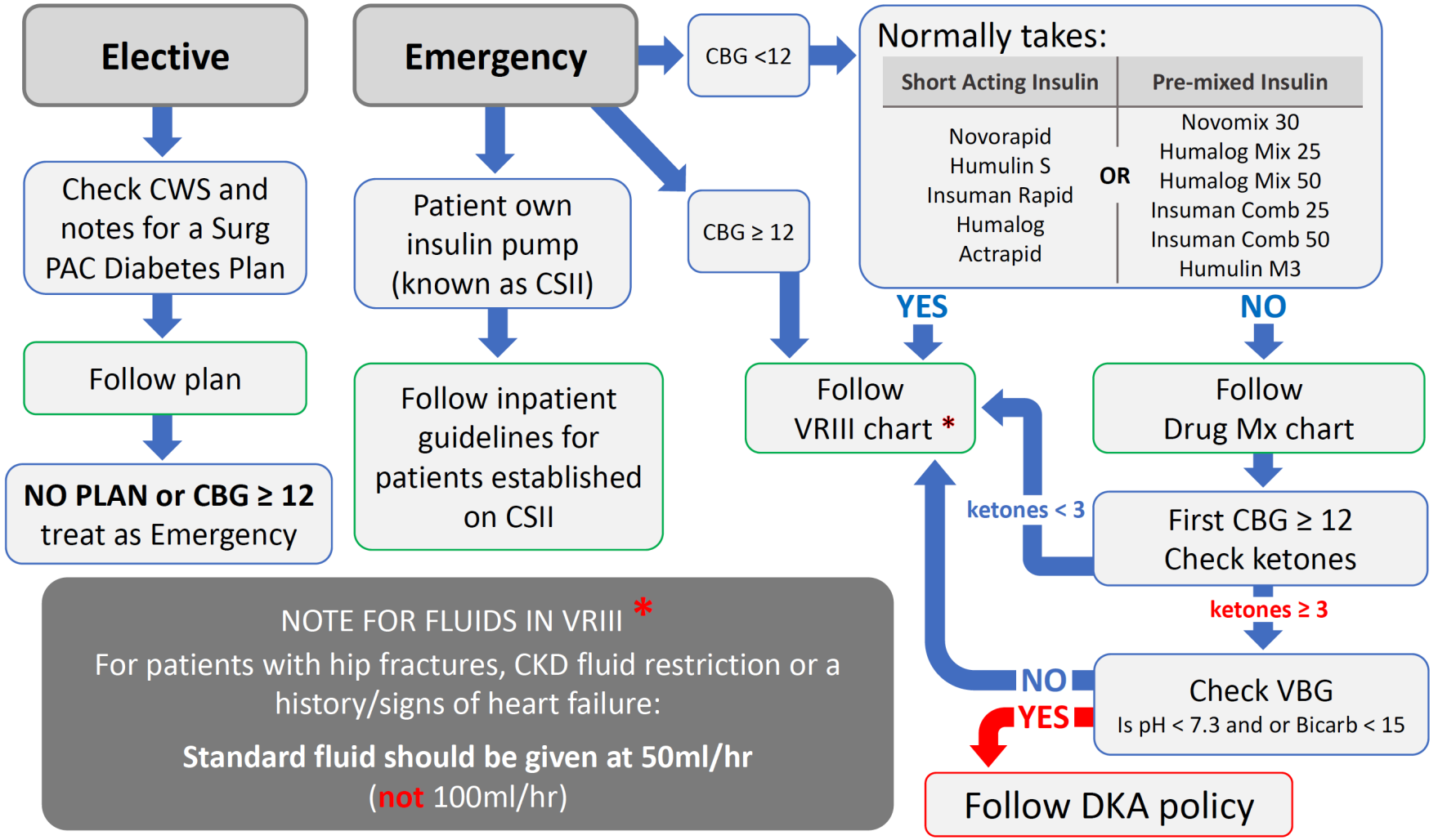
Ver 1 26-4-19

QUICK REF. CARD

QUICK REFERENCE GUIDE FOR DIABETES MANAGEMENT

A CHART MUST BE FOLLOWED ON MEDICAL ADVICE OR ONCE PATIENT HAS MISSED ONE MEAL



AREAS FOR IMPROVEMENT

- Concern/ DATIX incidents:
  - VRIII running intra-operatively with no documentation of either CBG monitoring or VRIII prescription chart
  - Non-elective patient (so no PAC) with no diabetes prescription chart with BM >17 in recovery – treatment started for DKA
- All patients with diabetes need to be on a Drug management or VRIII chart
- From CBG analysis in recovery, it does appear that both PAC documentation and presence of chart correlate with improved peri-operative glycaemic control.

PAC STICKERS NEW

DIABETES PERI-OPERATIVE ANAESTHETIC REFERRAL

eGFR		/ / 20
HbA1c		/ / 20

Able to manage medications YES ☐ NO ☐

Hypoaware (can manage hypoglycaemia) YES ☐ NO ☐

Reason for referral HbA1c 70-80 ☐ Urgent ☐

Anaes. Plan on CWS Y ☐ N ☐ POD ref. ☐ VRIII ☐ Drug Mx ☐

DRUG Mx NEW

Name:

Hosp N.O: ADDRESOGRAPH

D.O.B:

Hospital:

Ward:

Consultant:

Date: / / 20

DRUG Mx

Surgical diabetes management for patients with good pre-operative control expected to miss one meal

INSTRUCTIONS

- **Diet controlled diabetes does not require additional management or monitoring**
- **Record CBG hourly in all patients** (excluding diet controlled diabetes)
- **Manage elective patients as per Pre-Assessment Clinic (PAC) Diabetes Plan on CWS**
- **If no PAC plan on CWS follow 'Quick Reference Guide'**
- **This chart is appropriate for patients with good diabetes control - HbA1c < 70**
- **NOT generally appropriate for:**
  - **Systemically unwell patients - consider VRIII**
  - **Poorly controlled diabetes, HbA1c ≥ 70 - consider VRIII**

Continuous Subcutaneous Insulin Infusion (CSII) should be continued (stop bolus when NBM) see PAC plan

DIABETES DRUG MANAGEMENT FOR DAY OF SURGERY

If no PAC plan follow - Quick Reference Guide (card or poster)

INSULIN

Long Acting Insulin (not a complete list see BNF) :

Lantus
Toujeo
Glargine
Xultophy
Detemir
Humulin I
Insuman
Basal. Insulatard

80% of last dose should be given

Usual dose at usual time post-op

If omitted contact medical or diabetes team for advice

Short Acting or Pre-mixed Insulin

See pre-op plan – CWS, Notes and Patient

If no plan available - follow VRIII (see Quick Reference Guide)

NON-INSULIN

TAKE AS NORMAL

**Metformin	DPP-IV Inhibitor	Glitazones	GLP-1 Analogues
Only if eGFR More than 60 ml/min/1.73m²	Sitagliptin Vildagliptin Saxagliptin Alogliptin Vildagliptin	Pioglitazone	Exenatide Liraglutide Lixsenatide Dulaglutide Semaglutide

OMIT WHILE NBM | **OMIT DAY OF SURGERY**

**Metformin	Meglitinide	SGLT-2 Inhibitors	Acarbose	Sulphonylurea
If eGFR Less than 60 ml/min/1.73m²	Repaglinide Nateglinide	Dapagliflozin Empagliflozin Canagliflozin	Acarbose	Glibenclamide Gliclazide Glipizide Glimepiride Tolbutamide

** METFORMIN: If contrast medium is to be used AND / OR eGFR < 60 ml/min/1.73m2, metformin should be omitted on the day of surgery. If contrast used then omit metformin for the following 48 hours and encourage oral fluid intake.

WARN THE PATIENT THEIR CBG MAY BE ERRATIC FOR SEVERAL DAYS FOLLOWING SURGERY

TREATING HYPOGLYCAEMIA = CBG < 4 mmol/l

NURSE LED TREATMENT — **CALL FOR HELP + CHECK A-B-C**

Is patient asymptomatic or suitable for oral glucose - 4 glucose tablets or 2 glucose gels

Is patient symptomatic or NBM:

IV access secured

- Give 20% Glucose 100 mls IV STAT
- Check CBG every 15 mins
- If CBG < 4 mmol/L repeat 20% Glucose IV up to 3 times (4 Boluses in total)

OR... If NO time to secure IV access

- 1 mg Glucagon IM once + Secure IV access
- Give 20% Glucose 100 mls IV STAT + Check CBG every 15 mins
- If CBG < 4 mmol/L repeat 20% Glucose IV up to 3 times (4 Boluses in total)

If hypoglycaemia continues after 3 boluses of 20% glucose call medical or diabetes team

20% GLUCOSE			Date	Time	Sign	Date	Time	Sign	GLUCAGON			Date	Time	Sign
100 ml	IV	BOLUS							1 mg	IM	Once in 24 hrs			
AS PER TREATING HYPOGLYCAEMIA									AS PER TREATING HYPOGLYCAEMIA			Once in 24 hrs		
Sign		Date							Sign		Date			

DO NOT TREAT HYPERGLYCAEMIA FOR ONE HOUR AFTER TREATING A HYPOGLYCAEMIC EPISODE

TREATING HYPERGLYCAEMIA = CBG > 12 mmol/L

IF URGENT SURGERY CONTACT ANAESTHETIST AND COMMENCE VRIII

Check Urinary or Blood Ketones

- **If Urinary ketones ≥ +++ or Blood ketones ≥ 3mmol/L**
  - Follow DKA management guidelines
  - URGENT Medical or Diabetes Team referral and CONTACT Anaesthetist assigned to patient
- **If Urinary ketones ≤ ++ or Blood ketones < 3mmol/L**
  - Does the patient have TYPE 1 or TYPE 2 Diabetes ? (TICK and DELETE as appropriate below)

TICK AND DELETE	TYPE 1 DIABETES ◯	TYPE 2 DIABETES ◯
Time (hrs)	Give a Fast Acting Insulin SC - Novorapid®:	Give a Fast Acting Insulin SC - Novorapid®:
0	• To calculate dose assume 1 unit will drop CBG 3 mol/L, aim for CBG 9 mmol/L	• Give 0.1 units/Kg (max 10 units) patients with type 2 diabetes require more insulin than type 1
1	• Repeat CBG after one hour	• Repeat CBG after one hour
2	• If CBG > 12mmol/L consider repeat dose, 2 hours after initial dose	• If CBG > 12mmol/L consider repeat dose 0.1 units/Kg (max 6 units), 2 hours after initial dose
3	• Repeat CBG after one hour • Start VRIII if CBG > 12mmol/L	• Repeat CBG after one hour • Start VRIII if CBG > 12mmol/L

IF HYPERGLYCAEMIA CONTINUES, CALL MEDICAL OR DIABETES TEAM AND REPEAT KETONES

IF PATIENT IS CONVERTED TO A VRIII PLEASE COMPLETE DETAILS BELOW

Reason for conversion to VRIII:

Time: :	Date: / / 20	Name:	Sign:

VRIII NEW

Name:

HOSP N.O: ADDRESOGRAPH

D.O.B:

MULTIPLE VRIII CHARTS | CHART OF

Hospital:

Ward:

Cons.:

Date: / / 20

VRIII

Variable Rate Intravenous Insulin Infusion

Medical reason

Surgical Pre-Assessment Clinic (PAC) plan - VRIII

'Quick Reference Guide' used

Other:

Please tick reason

INSTRUCTIONS

PRESCRIBERS

1. Write ALL usual diabetes medications in Drug Chart and Insulin Chart
2. Record VRIII as a supplementary chart on Drug Chart
3. If the patient is on LONG ACTING INSULIN prescribe 0.8 x normal dose (round down to nearest unit)
4. Omit all other diabetes medication (see (3.) above)
5. Prescribe Fluid on FLUID PRESCRIPTION (below)
6. Prescribe VRIII on VRIII PRESCRIPTION (page 3)
7. Daily U+E's, change fluid as appropriate
8. Discuss how and when VRIII to be stopped

NURSES

1. Ensure every section of chart is appropriately completed
2. Sign for each fluid on FLUID RECORD (below)
3. Sign for each syringe of insulin on INSULIN RECORD (page 3)
4. Fluids must be administered through an IV pump
5. VRIII must always be given alongside pumped fluid containing glucose or dextrose
6. VRIII and Fluids must not be disconnected (eg peri-operatively)
7. VRIII can continue beyond 24 hrs, do not stop for doctor review
8. Usual diabetes medication and a meal must be given one hour before VRIII is stopped

WHICH FLUID TO USE FOR A FOR A VRIII

All fluids must contain glucose or dextrose and be run through an IV pump

STANDARD FLUID	ALTERNATIVE FLUIDS To be prescribed by an experienced clinician and reviewed regularly			
1st choice in most patients	K > 6 mmol/L	K < 4 mmol/L	If repeatedly hypoglycaemic despite VRIII Reduced Protocol	Customised Fluid To be used by diabetes team
0.45% NaCl + 5% Dextrose + 0.15% KCL or 'STANDARD'	0.45% NaCl + 5% Dextrose	0.45% NaCl + 5% Dextrose + 0.3% KCL	10% Glucose + 0.15% KCL	Prescribe on: FLUID PRESCRIPTION Specify rate: ml/hr
100 ml/hr	100 ml/hr	100 ml/hr	100 ml/hr	

Prescribed fluids are continuous (eg: as many bags required until VRIII stopped or prescription changed)

FLUID PRESCRIPTION AND RECORD

Daily electrolytes and change fluid as appropriate

PRESCRIPTION				RECORD			
FLUID PRESCRIPTION	Date	Time	Sign	Date	Time	Nurse Prep.	Nurse Chk.
Prescribed fluids are continuous at 100 ml/hr (unless specified as in Customised Fluid)							

TREATING HYPOGLYCAEMIA (ON VRIII) = CBG < 4 mmol/l

NURSE LED TREATMENT — Call for HELP + Stop IV Insulin + Check A-B-C

Is patient asymptomatic or suitable for oral glucose - 4 glucose tablets or 2 glucose gels

Is patient symptomatic or NBM:

IV access secured

1. Give 20% Glucose 100 mls IV Stat
2. Check CBG every 15 mins
3. If CBG < 4 mmol/L, repeat 20% Glucose IV up to 3 times (4 Boluses in total)

OR... If NO time to secure IV ACCESS

1. 1 mg Glucagon IM once + Secure IV access
2. Give 20% Glucose 100 mls IV Stat + Check CBG every 15 mins
3. If CBG < 4 mmol/L, repeat 20% Glucose IV up to 3 times (4 Boluses in total)

Restart VRIII once CBG>4, run VRIII at 0.2 ml/hr for 1 hour, after 1 hour follow a reduced VRIII protocol (i.e. IN to ST)

CONTINUED TREATMENT

1. If persistent Hypoglycaemia after 3 boluses of 20% Glucose:
   - URGENT Medical or Diabetes Team review
2. If Hypoglycaemia occurs with Reduced VRIII protocol use 10% Glucose + 0.15% KCL (page 1)

20% GLUCOSE BOLUS			Date	Time	Sign	Date	Time	Sign	GLUCAGON			Date	Time	Sign
100 ml	IV	BOLUS							1 mg	IM	Once in 24 hrs			
As per treating HYPOGLYCAEMIA									As per treating HYPOGLYCAEMIA			Once in 24 hrs		
Sign		Date							Sign		Date			

TREATING HYPERGLYCAEMIA (ON VRIII) = CBG > 12 mmol/L

INITIAL TREATMENT — Check Urinary or Blood ketones

1. If Urinary ketones ≥ +++ or Blood ketones ≥ 3mmol/L
   a. Follow DKA management guidelines
   b. Urgent Medical or Diabetes Team review, if applicable Contact Anaesthetist on list
2. If Urinary ketones ≤ ++ or Blood ketones < 3mmol/L
   a. If patient unwell - Medical Team review
   b. Hourly Blood ketones and continue hourly CBG

CONTINUED TREATMENT

1. If patient has CBG > 12 mmol/L despite VRIII for three hours
   - Consider changing to an increased VRIII protocol
2. If persistent Hyperglycaemia
   - Medical Team or Diabetes Team review

RESTARTING USUAL DIABETES MEDICATION

- Patient must be able to eat and drink normally
- Usual diabetes medication and a meal must be taken one hour before VRIII is stopped
- If LONG ACTING INSULIN was omitted, then continue VRIII till next LONG ACTING INSULIN dose given or contact Diabetes Team
- Once VRIII stopped please refer to standard CBG monitoring
- If patient is new to insulin as part of an emergency procedure consult Diabetes or Medical Team before stopping VRIII
- If patient's CBG is outside the range of 4-14 mmol/L then consult Diabetes or Medical Team prior to discharge

USUAL DIABETES MEDICATION AND A MEAL MUST BE GIVEN ONE HOUR BEFORE VRIII IS STOPPED