ST VINCENT'S HOSPITAL SYDNEY
A FACILITY OF ST VINCENT'S HEALTH AUSTRALIA

Policies & Protocols

Hyperglycaemia and Insulin Management Protocol

Procedure:

Objectives:

Hospitalised patients with hyperglycaemia (BGL >10mmol/L) are treated safely and effectively using oral diabetic agents and/or subcutaneous insulin to minimise:

- High blood glucose levels, BGL> 10mmol/L3
- Low blood glucose levels, BGL < 4mmol/L

NB: Individual patient factors, i.e. age, comorbidity etc may require blood glucose targets to be altered.

Patients admitted with Diabetic Ketoacidosis or Hyperosmolar Hyperglycaemic State are managed according to the Procedure for management of DKA/HHS Protocol.

Fasting patients in ICU are managed according to the ICU Insulin Infusion Management for Hyperglycaemia Protocol.

Patients admitted with a subcutaneous insulin pump are managed according to the Guidelines for Continuous Subcutaneous Insulin Infusion Pump in the Hospital Setting

Principles of Action:

- Identify patients with hyperglycaemia (BGL >10mmol/L) and where possible treat the underlying cause.
- Treat hyperglycaemia with glucose lowering agents that are not contraindicated during acute illness. For guidance see:
    - Appendix 1 - Diabetes or Hyperglycaemia Prescribing Guideline
    - Appendix 2 - Supplemental Insulin Prescribing Guideline
    - Appendix 3 - Elective Procedure Diabetes Prescribing Guideline
    - Appendix 4 - Insulin Infusion Transition Prescribing Guideline (non DKA/HHS)
    - Appendix 5 - Corticosteroids: Diabetes or Hyperglycaemia Prescribing Guideline
    - Appendix 6 - Insulin Profile Chart
    - Appendix 7 - Non Insulin Medication List
- Prescribe:

- Subcutaneous insulin on the 'NSW Health Adult Subcutaneous Insulin Prescribing Chart' SMR130035.
- *'Insulin paper chart exists' i*n MedChart to reduce incidence of accidental insulin omission.

- Document administration of subcutaneous insulin on the NSW Health Adult Subcutaneous Insulin Prescribing Chart SMR130035.
- Monitor blood glucose levels (BGLs) for all patients receiving subcutaneous insulin:
  - At minimum qid
  - If fasting for a procedure, at minimum 2-hourly, if BGL falls below 6mmol/L at minimum 1-hourly (NB excludes overnight).

Definitions:

Blood Glucose Monitoring (BGM)	Measurement and documentation of blood glucose levels (BGL) using a capillary (finger prick), venous or arterial blood sample and point of care (bedside) blood glucose meter.
Hyperglycaemia	Blood glucose level more than 10mmol/L (capillary, arterial or venous blood sample).
Hypoglycaemia	Blood glucose level less than 4mmol/L (capillary, arterial or venous blood sample).
High Risk Medicine	Medicines that have a high risk of causing injury or harm if they are misused or used in error1.
Independent Second Check	A procedure in which two clinicians separately check (alone and apart from each other, then comparing results) each component of prescribing, dispensing, and verifying high-risk medicine before administering to the patient1.
Lipohypertrophy	Localised proliferation of subcutaneous fat at insulin injection sites, caused by the lipogenic effect of insulin.
Multi-dose vial	A vial of liquid medication intended for parenteral administration (injection or infusion) that contains more than one dose of medication.
5-Rights of medication administration	The 'Right Patient, Right Drug, Right Dose, Right Time, Right Route' is observed on every occasion that a clinician administers a medication to a patient2.

Roles and Responsibilities:

Medical Officers are responsible for:

- Prescribing glucose lowering medication, including insulin, in accordance with this procedure, the Medication Handling in NSW Public Health Facilities Policy and the High-Risk Medicines Management Policy – NSW Health Policy Directives.
- Ensuring all patients who are at risk of hypoglycaemia **AND** are unable to eat or drink normally have a patent wide-bore intravenous cannula in situ.
- Referring all patients with type 1 diabetes, all patient on a subcutaneous insulin pump and all patients with persistent hyperglycaemia (BGL >10 for 24 hours or

more) to the Endocrine Team as per SVH Inpatient Diabetes Management Policy.

Registered Nurses are responsible for:

- Preparing and administering glucose lowering medication, including insulin, in accordance with this procedure, the Medication Handling in NSW Public Health Facilities Policy and the High-Risk Medicines Management Policy – NSW Health Policy Directives.
- Supervision of patient self-administration of glucose lowering medication in accordance with the Inpatient Supervised Self Administration of Subcutaneous Insulin or Glucagon-like peptide-1 (GLP-1) analogs Protocol.
- Monitoring patients' blood glucose levels according to SVH Blood Glucose and Blood Ketone Monitoring Procedure.

All clinical staff are responsible for:

- Treating hypoglycaemia according to SVH Hypoglycaemia Management Protocol.
- Alerting clinicians in patient clinical handover, that insulin (a high-risk medicine) is being used1.
- Reporting insulin incidents, including near-miss incidents, and probable adverse events associated with insulin use, using the facility's incident management system2 – Riskman.
- Referring patients new to insulin, or a new insulin type, to the inpatient Diabetes CNC for education prior to discharge.

Nurse Unit Managers are responsible for ensuring:

- Safe storage of insulin in the ward/clinical department according to Medication Handling in NSW Public Health Facilities – NSW Health Policy Directive and by ensuring:
    - Imprest insulin (unused) is refrigerated and stored in separate individual containers according to insulin type, in a locked medication room or secure area.
    - Insulin allocated for patient use, is stored in the patient's bed-side locked drawer, or similar, and not in the ward/clinical department medication fridge. NB: Insulin vials do not require refrigeration once opened and can be used for 28 days (or as labelled), after which time they should be discarded.
    - Patient's insulin supply from home (vials and/or pen devices) are either:
        - Sent home with a family member OR
        - Labelled and stored in the:
            - Patient's bed-side locked drawer (if in use). OR
            - Clinical unit refrigerator. Insulin stored in the clinical unit refrigerator must be:
                - Packaged, sealed and labelled with the patient's name, date of birth, MRN
                - Labelled **NOT FOR use by any other patient**.
                - Returned to the patient at discharge.

Pharmacists are responsible for:

- Ensuring safe and effective use of medication in accordance with SVH Medicines - Ordering, Supply and Storage of Medicines Protocol, Medication Handling in

NSW Public Health Facilities PD2013_043 and High-Risk Medicines Management Policy PD2015_029

Diabetes Educators are responsible for:

- Ensuring patients new to insulin, or a new insulin type, receive appropriate education and training and are supplied with equipment required to safely self-administer insulin once discharged.

Process:

Subcutaneous Insulin Prescribing

1. The Medical Officer reviews the following Diabetes Prescribing Guidelines when prescribing subcutaneous insulin:

    - Appendix 1 - Diabetes or Hyperglycaemia Prescribing Guideline
    - Appendix 2 - Supplemental Insulin Prescribing Guideline
    - Appendix 3 - Elective Procedure Diabetes Prescribing Guideline
    - Appendix 4 - Insulin Infusion Transition Prescribing Guideline (non DKA/HHS)
    - Appendix 5 - Corticosteroids: Diabetes or Hyperglycaemia Prescribing Guideline
    - Appendix 6 - Insulin Profile Chart
    - Appendix 7 - Non Insulin Medication List
    - Appendix 8 - Humulin R 500 units/mL Concentrated Insulin

    NB: These guidelines do not substitute for clinical judgement.

2. The Medical Officer prescribes:

- All subcutaneous insulin on the 'NSW Health Adult Subcutaneous Insulin Prescribing Chart SMR130035 (unless prescribing Humulin R 500units/mL concentrated insulin, then use Humulin R U500 Insulin Chart P440).
- *'Insulin paper chart exists' i*n MedChart to reduce incidence of accidental insulin omission.

3. The Medical Officer ensures the:
    - Insulin prescriptions contain the patient's full name, date of birth and Medical Record Number
    - Patient's name is **printed** on the insulin chart.
    - Allergies and Adverse Drug Reactions section is completed.
    - Insulin prescription contains: o Insulin name written in full o Prescription date
        - Insulin dose and frequency of administration
        - Prescriber contact, signature and printed name

            - Discontinuation of insulin prescription by drawing:
                - Two oblique lines in the administration column of the day of discontinuation, with signature and date.
                - A single oblique line through the insulin name.

4. The Medical Officer reduces the risk of insulin administration errors by ensuring the prescription:

- Does NOT include generic-names e.g. use 'NovoMIX 30' not 'Aspart 30% / aspart protamine 70%'.
- Avoids using 'U' or 'IU" or any other abbreviation of 'units', or abbreviated insulin names when prescribing insulin.
- Is not modified (e.g. change of insulin type or dose). Commence a new prescription.
- Is clear and unambiguous (e.g. insulin name, dose, frequency and timing).

Subcutaneous Insulin Administration:

1. **Subcutaneous Insulin Equipment:**

- 0.5mL (50 units) insulin syringe - for all insulin doses 50 units or less.
- 1mL (100 units) insulin syringe - for all insulin doses 51 units or more.
- 3mL insulin vial.
- Alcohol swab.
- Patient's own insulin may only be used in the event that the clinical area does not have immediate access to pharmacy stock. The insulin must be obtained as soon as possible, and when received the patient's own supply must be withdrawn from use[2].
- If concentrated insulin is prescribed see Appendix 8 or 9 for specific information.

2. **Subcutaneous Insulin Preparation:**

The Registered Nurse:

- Confirms insulin prescription is valid (see above, point 3 under **Subcutaneous Insulin Prescribing**)
- Refers to the insulin prescription to ensure the:

  Right Patient: correct patient name is on pharmacy label.

  Right Drug: selection of correct insulin type/name on vial.

  Right Dose: correct dose prepared using an insulin syringe measured in units.

  Right Time: dose is prepared and administered at the prescribed time.

  Right Route: dose is administered subcutaneously.

- Ensures the insulin is in date by checking both the:
  - Expiry date on the vial and
  - Date that the vial was opened (insulin must be discarded 21-28days from opening, as labelled)
- Gently but thoroughly mixes all cloudy insulin types to ensure adequate re-suspension. Do not shake vigorously or clumping may occur.
- Wipes insulin vial port with an alcohol swab[4].
- Draws up required insulin dose expelling all air bubbles.
- Seeks **mandatory** independent second check from a second RN[1,2]

3. **Subcutaneous Insulin Administration Procedure Steps:**

The Registered Nurse:

- Explains the process to the patient.
- Asks patient if they have any allergies or adverse drug reactions to prepared medication.
- Ensures two RNs complete the medication administration checking procedure at the bed-side.
- Palpates for lipohypertrophy and if present avoids injecting insulin into this site.
- Administers insulin injection subcutaneously, preferably in the abdomen, using a 90° angle for normal and overweight patients or a 45° angle for underweight patients.
- Avoids insulin administration error by:
    - Contacting the MO if concerned about a prescribed insulin dose. Never omit insulin without consulting the prescriber or after hours delegate.
    - **NEVER** sharing multi-dose insulin vials between patients, **for SINGLE patient use only**[2].
    - **NEVER** preparing subcutaneous insulin using a tuberculin syringe or 1mL syringe as this can result in 10 fold insulin overdose.
    - **NEVER** drawing up insulin into a syringe from an insulin pen device.
    - Preparing insulin immediately prior to administration[2].

Disposal of Waste/Equipment:

- As per SVH Waste Management and Infection Control Policies and Procedures:
    - Dispose of insulin syringe in approved sharps containers[4].
    - Dispose of insulin vial in approved sharps containers when expired, contaminated, damaged or the patient has been discharged.

Post Procedure Patient Management:

- All patients receiving subcutaneous insulin require blood glucose monitoring (as per SVH Blood Glucose and Blood Ketone Monitoring Procedure):
    - At minimum qid
    - If fasting for a procedure, at minimum 2-hourly and if BGL falls below 6mmol/L at minimum 1-hourly (NB excludes overnight).
- Blood glucose levels are reported to the prescriber or the treating team (as per SVH Blood Glucose and Blood Ketone Monitoring Procedure).
- Blood glucose response should be reviewed by the prescriber or the treating team, at minimum, once daily.
- All patients who develop hypoglycaemia are managed according to SVH Hypoglycaemia Management Protocol.

Documentation:

- All subcutaneous insulin prescribed and administered is documented on the NSW Health Adult Subcutaneous Insulin Prescribing Chart SMR130035 (unless prescribing Humulin R 500units/mL concentrated insulin, then use *Humulin R U500 Insulin Chart* P440).
- All patient management of hyperglycaemia is documented in the patient's healthcare record.
- All patient management of hypoglycaemia is documented on the NSW Health

Adult Subcutaneous Insulin Prescribing Chart SMR130035 and in the patient's healthcare record.

Compliance:

- Reported Riskman incidents relating to insulin prescription and/or administration will be reviewed quarterly at the Endocrine Morbidity and Mortality meeting.
- Practice compliance will be monitored using:
    - Insulin Prescribing and Administration Bundle Audit - biannually, see Appendix 10.
    - Observational Insulin Administration Audit - biannually, see Appendix 11.
    - Observational medication fridge audit – monthly, see Appendix 12.

Appendices:

- Appendix 1 - Diabetes or Hyperglyacemia Prescribing Guideline
- Appendix 10 - Hyperglycaemia Insulin Management Bundle Audit Tool
- Appendix 11 - Insulin Observational Audit Tool
- Appendix 12 - Medication Fridge Observational Audit Data Collection Form
- Appendix 2 - Supplemental Insulin Prescribing Guideline
- Appendix 3 - Elective Procedure Diabetes Prescribing Guideline
- Appendix 4 - IV Insulin Transition Prescribing Guidelines
- Appendix 5 - Corticosteriod Hyperglycaemia Prescribing Guidelines
- Appendix 6 - Insulin Profile Chart
- Appendix 7 - Non-insulin medication
- Appendix 8 - Humulin R U500 Concentrated Insulin Prescribing Guideline
- Appendix 9 - Insulin glargine 300units per mL, Toujeo

Standard:

Australian Commission on Safety and Quality in Healthcare. National Safety and Quality Health Service Standards: Medication Safety Standard 4, 2015.

References:

1. NSW Health, 2015. Policy Directive: High Risk Medicines Management Policy, accessed 11 September 2015, http://www0.health.nsw.gov.au/policies/pd/2015/pdf/PD2015_029.pdf.
2. NSW Health, 2013. Policy Directive: Medication Handling in NSW Public Health Facilities, accessed 11 September 2015, http://www0.health.nsw.gov.au/policies/pd/2013/pdf/PD2013_043.pdf.
3. Australian Diabetes Society, 2012. Guidelines for Routine Glucose Control in Hospital, accessed 11 September 2015, http://diabetessociety.com.au/documents/ADSGuidelinesforRoutineGlucoseControlinHospitalFinal2012.pdf.
4. NSW Health, 2007. Policy Directive: Infection Control Policy, accessed 11 September 2015, <http://www0.health.nsw.gov.au/policies/pd/2007/pdf/PD2007_036.pdf.
5. Australian Diabetes Society, 2012. Peri-operative Diabetes Management Guidelines, accessed 11 September 2015, https://diabetessociety.com.au/documents/PerioperativeDiabetesManagementG

uidelinesFINALCleanJuly2012.pdf.

Related SVH, SV&MHS and SVHA Policies & Procedures:

- ICU Insulin Infusion Management Protocol

Risk Rating:
Not set

Focus Area(s):
- Patient Care - Assesment/Management

Linked PP:
- Blood Glucose and Blood Ketone Monitoring Protocol
- Hypoglycaemia Management Protocol
- Incident Management Policy
- Inpatient Diabetes Model of Care Policy
- Inpatient Supervised Self Administration of Subcutaneous Insulin or Glucagon-like peptide-1 (GLP-1) analogs Protocol
- Procedure for Management of Diabetic Ketoacidosis (DKA) and Hyperosmolar Hyperglycaemic State (HHS) Protocol
- SVH Medicines - Ordering, Supply and Storage of Medicines Protocol
- Waste Management Policy

Departments:
- Clinical Organisation Wide

Revision History:

Date Issued:	2/2/2016
Date of Last Review:	2/2/2016
Date of Next Review:	2/2/2019
Committee(s):	SVHN Patient Safety & Quality Committee
Approved By:	Chief Executive
Identifier:	8229

Suggest change (0 changes already suggested)
