Safety Information 001/24

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Distributed to:
Chief Executives
Directors of Clinical Governance
Director, Regulation and Compliance Unit

Action required by:
Chief Executives
Directors of Clinical Governance

We recommend you also inform:
Directors, Managers and Staff of:
- Medical Services
- Nursing and Midwifery
- Nutrition and Dietetics
- Pharmacy

Drug & Therapeutics Committees
Chief Information Officers
Chief Clinical Information Officers
All other relevant clinicians and clinical departments.

Expert Reference Group

Content reviewed by:
Medication Safety Expert Advisory Committee
Safety and Quality Advisory Group

Clinical Excellence Commission
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Fluid therapy and medicine dosing in adult patients who have a low body weight

Situation

Clinicians need to be aware of the importance of taking and recording accurate patient weight measurements and should consider the need for adjusting doses/volumes when prescribing medicines and intravenous fluids for adults who have a low body weight. Inadequate consideration of patient factors such as weight and body composition when prescribing medicines and intravenous fluids may lead to adverse patient outcomes.

Background

Accurate assessment and documentation of weight is essential for the delivery of safe and effective patient care. Consideration of body weight is especially important to prescribe appropriate volumes of intravenous fluids (to avoid fluid overload), and correct doses of medicines. Weight-based dosing is particularly important for medicines:

- with a narrow therapeutic index
- at high-risk of causing patient harm (for example, heparin, paracetamol and anaesthetic agents)
- that require time above a minimum plasma concentration (for example, some antimicrobial medicines).

For these medicines, incorrect dosing based on an overestimation of weight may lead to adverse effects, while underestimation of weight may lead to suboptimal therapeutic effect, both of which may result in patient harm. Low body weight is not clearly defined however a reference point may be adult patients weighing less than 50 kg or a Body Mass Index (BMI) of less than 20 kg/m^2 (BMI = weight [kg] ÷ height^2 [m]).

Assessment

The physiological changes associated with low body weight, malnutrition and any associated comorbidities may affect the way a medicine is absorbed, distributed, metabolised and eliminated. As such, the effects of medicines can vary greatly in patients who have low body weight which makes medicine dosing challenging. Traditional methods for calculating dose using body weight or derived measures (for example, Ideal Body Weight, Lean Body Weight, Adjusted Body Weight, Body Surface Area) may not be adequate or appropriate which can lead to under- or over-dosing.

As guidelines and reference texts related to medicine dosing in adults who have low body weight are not readily available for many medicines, and there is limited data on the use of medicines in this patient cohort, a pragmatic approach needs to be applied on a case-by-case basis. This approach should consider an individual patient's actual weight in addition to other risk factors such as hepatic or renal impairment, prolonged fasting or dehydration, chronic malnutrition, chronic excessive alcohol use, advanced age or frailty. Medicines typically prescribed using a fixed dosing regimen may require dose adjustment in patients who have a low body weight to account for changes in size, composition, metabolism and co-morbidities (for example, paracetamol). In these cases, where available, weight-based doses used primarily for paediatric patients may be considered (for example, mg/kg/dose). Dosing of medicines with a narrow therapeutic index should be guided by renal and hepatic function and adjusted according to therapeutic levels for medicines such as vancomycin or titrated to clinical effect for medicines such as intravenous anaesthetics.

Special consideration should also be given when prescribing intravenous fluid therapy. As patients who have low body weight may be more susceptible to fluid overload, volumes and rates of administration should be adjusted according to weight (for example, mL/kg/day) with consideration of current clinical fluid status and any co-morbidities that may affect fluid balance.

Recommendations

- All adult patients should have their weight measured and documented within 24 hours of ward admission and repeated at least weekly in the acute setting or monthly in long stay settings/facilities as per NSW Health Guideline *Growth Assessment in Children and Weight Status Assessment in Adults* (GL2017_021).
- Facilities should establish processes for the systematic weighing of patients and standardisation of weight documentation with the aim to improve compliance, accuracy and consistency of documentation. These processes should promote efficient workflow practice and ensure that measurements can be easily performed, recorded at the point of care (to the nearest 100 grams), and directly entered into designated locations within the patient's medical record and on relevant clinical documents.
- Facilities should ensure sufficient availability of appropriate and properly functioning equipment for the measurement of patient weight that is accessible for patients with varying degrees of mobility (including sitting, standing and bed-based scales). Scales should have a weight capacity of above 300 kilograms and be accurate to 100 grams (0.1 kg).
- Estimation of patient weight should be limited to the few clinical situations where measuring weight may not be appropriate, such as potentially life-threatening illness requiring emergency treatment. Any estimated or patient-stated weights should be documented accordingly.
- Prescribers should confirm the weight that is documented in the patient's medical record is current (within the last 7 days in hospital) prior to weight-based dosing. The patient's weight, the calculated dose and the dose per weight (for example, mg/kg) should be recorded against the medication order or in the patient's health record.
- Prescribers should consult with pharmacists and other relevant specialists when prescribing medicines and fluids therapy for adult patients who have a low body weight.
- The appropriateness of medicine doses should be independently assessed during the medication order review before a medicine is dispensed and/or administered. Clinicians should adhere to their local policy regarding safe and accurate medication administration, including independent second person checking procedures where applicable (see NSW Health Policy Directive *Medication Handling* (PD2022_032).
- Therapeutic drug monitoring should be utilised where available to allow for dose adjustments based on therapeutic targets (for example, vancomycin, methotrexate and tacrolimus). Other relevant pathology tests should be utilised to monitor for any potential adverse effects of the specific medicine (for example, increases in potassium for ciclosporin).
- Strategies may be utilised within the electronic medical record (eMR) to promote safe and appropriate dosing of fluid therapy and medicines in adult patients who have a low body weight. These may include:
    - the use of prompts to record and consider patient weight when prescribing medicines that require weight-based dosing, to review patient weight and all medication orders when there is a >10% variation in patient's previous recorded weights, and to consider dose adjustment when prescribing medicines for patients who weigh less than 50 kg (or who have a BMI less than 20 kg/m2)
    - the availability of electronic weight-based order sets/sentences and the use of weight cut-offs and order set/sentence filtering
    - dose range checking
    - easily accessible dose calculators/advisors.
- Volumes and rates of administration of intravenous fluid therapy should be adjusted according to weight, fluid balance and co-morbidities. The National Institute for Health and Care Excellence Clinical Guideline Intravenous fluid therapy in adults in hospital CG174 recommends reducing the volume of fluid therapy to 20-25 mL/kg/day, particularly for patients who are malnourished and at risk of refeeding syndrome, who are older or frail, or who have renal impairment or cardiac failure.
- Patients receiving continuous intravenous fluid therapy should have their weight measured and documented at least twice weekly in addition to close daily monitoring of clinical fluid status (including assessment of vital signs and other indicators such as skin turgor, mucous membranes, peripheral oedema, jugular vein distension, etc.), fluid balance charts and laboratory values as required (for example, full blood count, urea, creatinine and electrolytes).

Required actions for the Local Health Districts/Networks

1. Distribute this Safety Information to all relevant clinicians and clinical departments.
2. Drug and Therapeutics Committees should consider the information and recommendations contained within this Safety Information in consultation with relevant clinicians and the local eMeds/ICT team.
3. Escalate any concerns to CEC-MedicationSafety@health.nsw.gov.au.
4. Report any incidents associated with the prescribing or administration of fluids or medicines to patients who have a low body weight via the incident management system (e.g., ims+).

References

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- NSW Health Guideline Growth Assessment in Children and Weight Status Assessment in Adults [GL2017_021].
- NSW Health Policy Directive Medication Handling [PD2022_032].
- Queensland Health Guideline Prescribing Intravenous Fluids for Adults.
- Queensland Health Guideline Safe paracetamol use.
- NSW Health SESLHD Prescribing Protocol for the Safe Use of Paracetamol.
- National Institute for Health and Care Excellence Clinical Guideline Intravenous fluid therapy in adults in hospital [CG174]
- NSW Therapeutic Advisory Group Inc. Paracetamol Use: A Position Statement
- Metro North Health Guideline Antimicrobial Therapeutic Drug Monitoring