Blood glucose monitoring

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Blood glucose monitoring is widely undertaken in a number of clinical situations. Point of care testing (or near-patient testing), where samples are not sent to the laboratory, is a convenient method commonly used in blood sugar monitoring. Modern machines give a rapid and, if used correctly, accurate measurement of blood glucose but there are significant risks of error (DoH, 1996).

Professional responsibilities
Practitioners undertaking blood glucose monitoring should only do so if they have completed an appropriate programme of education and have enough experience to be deemed competent. Practice must always be in accordance with local policies and guidelines.

Practitioners should have a sound knowledge of the normal blood sugar range and should be confident about taking the appropriate action if results are abnormal.

Related physiology
Glucose is essential for cell metabolism. For optimum cell function, blood glucose levels should be maintained normally at a level of 4–7mmols/L. Hyperglycaemia is levels over 7mmols/L and hypoglycaemia levels below 4mmols/L.

Signs of hyperglycaemia include:
- Reduced consciousness;
- Confusion or agitation;
- Polydipsia;
- Polyuria;
- And if diabetic ketoacidosis is suspected, probable hyperventilation, nausea, vomiting and diarrhoea.

Signs of hypoglycaemia include:
- Confusion or agitation;
- Pallor;
- Clammy skin;
- Reduced consciousness.

Indications
Blood glucose provides accurate information about how the body is controlling glucose metabolism. It is indicated in a range of conditions including:
- Diabetes;
- Seizures;
- Enteral and parenteral feeding;
- Liver disease or pancreatitis;
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Blood glucose monitoring
Near-patient testing

Skin puncture
Samples should be obtained from the edges of fingers. Avoid fingertips, as these are more sensitive. Rotate sites to prevent skin damage.
Commercial devices are available for puncturing the skin that allow sufficient skin penetration without causing undue discomfort to the patient. The use of normal hypodermic needles should be avoided as these may cause undue discomfort to the patient and raise the risk of needlestick injury.

Test strips
A new test strip should be used each time the procedure is undertaken and the machine should be calibrated at regular intervals.

Skin preparation
The skin at the sample site should be clean and dry. The skin should not be cleaned using alcohol, as this can affect the result (Blake, 1999).
Encourage patients to keep their hands warm prior to sampling as this helps good blood flow (Dougherty and Lister, 2004).

The procedure
- Collect together all the equipment including: test meter, test strips, finger pricking device/lancet, clean gauze and the patient’s records.
- Explain the procedure to the patient and gain verbal consent.
- Wash and dry your hands thoroughly.
- Apply gloves and don apron.
- If possible, ask the patient to wash and dry her or his hands (Fig 1). If not, wash finger with soap and water and allow to dry.
- Ensure that the patient is sitting or lying comfortably before the procedure.
- Ensure the code strip matches the meter code.
- Use lancet device to pierce the skin at the side of the finger and encourage bleeding by use of gravity (Fig 2). Avoid squeezing finger as this may affect the result (Blake, 1999).
- Wipe first drop of blood with sterile gauze (Fig 3).
- Encourage bleeding to obtain a drop large enough to cover the test strip (Fig 4).
- Apply this drop of blood to the test strip (Fig 5).
- Apply gauze to prevent further bleeding.
- Promptly dispose of lancet into sharps bin.
- Record the result clearly in nursing notes (Fig 6).
- Report abnormal results, having taken any corrective action within your sphere of competence.
- Remove and safely discard gloves and apron.
- Safely dispose of any waste.

Head injury or unconsciousness;
Stroke;
Alcohol or drug intoxicification;
Sepsis.