Insulin safety: self-directed learning

There are now over 25 different insulin preparations with differing actions but similar names. More recently higher strength and biosimilar insulins, along with fixed combination injectables have become available. Insulin is one of the top five high-risk medications worldwide and since 2010 several documents have been published focusing on insulin safety.

In addition to reading this summary of the key documents we recommend you complete the free e-learning module *Six steps to insulin safety* at www.cpd.diabetesonthenet.com. Completing this module (or equivalent), is part of the PITstop competency assessment.

NPSA safer administration of insulin

Identified two common errors:

- inappropriate use of non-insulin syringes, marked in ml and not in insulin units
- use of abbreviations such as 'U' or 'IU' for units. The dose may be misread e.g. 10U is read as 100.

Recommendations:

- always write the term 'units' in full
- always write the insulin name in full due to similar product names i.e. Humulin I and Humulin M3
- insulin syringes or commercial insulin pens must be used to measure and administer regular and
- single insulin (bolus) doses and all clinical areas and community staff treating patients with insulin have adequate supplies of insulin syringes which staff can obtain at all times
- insulin safety training is required for all those who prescribe, prepare, handle or administer insulin.

NPSA (2011) PSA003: The adult patient's passport to safer use of insulin

All adult patients on insulin should receive a patient information booklet and an insulin passport to help provide accurate identification of their current insulin products and provide essential information across healthcare sectors. (READ CODE: 8CE02 insulin passport has been given). Insulin passports can be ordered from www.nhsforms.co.uk or email nhsforms@mmm.com. Trend-UK's 2017 'Keeping Safe with insulin therapy' can be downloaded from www.trend-uk.org The PITstop handbook covers insulin safety in PITstop 2.

NICE ktt20 (2017, updated 2019) Safer insulin prescribing

Clinicians supporting people with diabetes who are receiving insulin therapy:

- give information about awareness and management of hypoglycaemia
- make the patient aware of the need to notify the DVLA. Clinicians should refer to chapter 3 of the DVLA's Assessing fitness to drive – a guide for healthcare professionals
- understand sick-day rule management and give appropriate information to patients
- give adults using insulin therapy a patient information booklet and an insulin passport
- are aware of the differences between new insulin products, including high-strength, fixed combination and biosimilar insulins and ensure patients receive appropriate training on their correct use. People should be advised to only use insulin in the way they have been trained because using it any other way may result in a dangerous overdoes or underdose.

NICE ktt20 includes recommendations from MHRA (2015), European Medicines Agency (2015) and NHS improvement patient safety alert (2016) about the use of new high strength, fixed combination and biosimilar insulins.

Additional recommendations include:

- consult the summary of product characteristics (SPC) and any education material, ensuring patients receive appropriate training on the correct use of the product and read and understand educational material

- encourage patients to monitor glucose levels closely after starting a new treatment and in the following weeks
- only use high-strength insulin in the prefilled pen it is supplied in. Never use a syringe to withdraw insulin from a pre-filled pen otherwise severe overdose can result
- When switching patients from standard-strength insulin to an insulin formulation that is not bioequivalent (such as Toujeo, insulin glargine 300 units/ml), a basal dose change may be required. A safe assumption is to reduce the dose by 20% when switching on or off Toujeo and adjust the dose to achieve target blood glucose.
- always prescribe the insulin dose in units ('units' to be spelled out and stated in lower case) and include the dose frequency. The strength of the insulin formulation should also be always included in the prescription
- explain the difference in appearance between different insulin preparations. Focus on colour differentiation, warning statements on carton/label and other safety design features (such as tactile elements on the pre-filled pen). If different short-and long-acting insulins are being prescribed together, the differences in appearance and use between the two pen devices must be highlighted
- patients who are blind or with poor vision must be instructed to always get assistance from another person who has good vision and is trained in using the insulin pen device.

The MHRA (2015) report highlights the new term 'dose step'.

Examples of dose steps that differ from 1 dose step = 1unit

- Tresiba 200units/mL. The pre-filled device dials in 2unit intervals i.e. 1 dose step
- The fixed combination Xultophy combines insulin (Insulin Degludec 100units/mL [Tresiba]) with the GLP-1 mimetic Liraglutide. One dose step of Xultophy is equivalent to one unit of insulin degludec and 0.036mg of Liraglutide. Readers are guided to Xultophy SPC.

FIT UK Forum for Injection Technique UK (2016) The UK Injection and Infusion Technique Recommendations, 4th edition

Chapter 9 focuses on safety and includes:

- use of safety-engineered devices, with protective mechanisms for all needles and sharp ends of the delivery device as first-line choice for certain patient groups
- needle recapping should not be done
- healthcare settings where insulin pens are used must follow a strict one-patient / one-pen policy
- safe disposal of sharps devices
- what to do in the event of a needle stick injury.

References:

- European Medicines Agency (2015) Guidance on the prevention of medication errors with high strength insulins. http://www.ema.europa.eu/ema/
- FIT UK Forum for Injection Technique UK (2016) The UK Injection and Infusion Technique Recommendations, 4th edition. www.fit4diabetes.com/united-kingdom/
- Medical and Health Products Regulation Agency (2015) High strength, fixed-combination and biosimilar insulin products: minimising the risk of medication error. www.gov.uk
- National Patient Safety Agency (2010) Rapid Response report: safer administration of insulin, ref 1243.
- National Patient Safety Agency (2011) The adult's patient passport to safer use of insulin, ref 1283.
- NHS Improvement (2016) Risk of severe harm and death due to withdrawing insulin from pen devices. www.improvement.nhs.uk
- NICE (2017, updated 2019) Key Therapeutic Topic ktt20: Safer insulin prescribing. https://www.nice.org.uk/advice/ktt20/chapter/Evidence-context