IV drug preparation and reconstitution

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The preparation and administration of intravenous (IV) drugs is a relatively common procedure in many areas of clinical practice. The NMC states that administration of medicines is ‘not solely a mechanistic task to be performed in strict compliance with the written prescription of a medical practitioner. It requires thought and exercise of professional judgement’ (NMC, 2002).

To practise accountably and in accordance with NMC requirements it is essential that nurses are competent in the preparation and reconstitution of a wide variety of drugs pertinent to their clinical area. This requires an extensive knowledge of pharmacological agents and their application.

Although it can be difficult to keep up to date with best practice and new research, nurses must ensure their knowledge and practice are informed and that they are aware of mechanisms to ensure that procedures are in line with current best practice, organisational policy and specific manufacturers’ recommendations in their own area of practice.

**Risk management**

In preparing to administer any drug nurses must be aware of the relevant health and safety issues, notably the safe use and disposal of sharps and good infection control practice.

The drug solution and its preparation may be hazardous to the health of the nurse preparing it or to those within the environment and the necessary precautions must be taken to minimise risk.

Drug errors can occur for many reasons but it has been suggested that many are caused by some nurses having poor mathematical skills (Trim, 2004).

Prior to any drug preparation it is essential that the dose/volume is calculated correctly and that all but the simplest calculations are checked by a second practitioner. Most organisations require that two nurses check drugs for IV administration, although in some working environments this may not be practical.

**The procedure**

Intravenous drugs come in a variety of presentations, the most common being single-dose glass ampoules or rubber-capped vials. The procedure varies slightly for each presentation.

**Rubber-capped vials**

- Wash the hands and don a clean apron (Fig 1);
- Check that both drug and diluent packaging are intact and are to be used prior to their expiry date (Fig 2);
- Break the seal on the container of the diluent;
- Using a syringe and needle (or a withdrawing needle) aspirate the required volume;
- Remove the plastic covering cap from the drug vial;
- If required, clean the rubber cap with an alcohol wipe. The effectiveness of this procedure is debatable but if it is carried out it is essential that the alcohol has
evaporated before any needles are inserted;
- Insert a venting needle into the rubber cap;
- Insert the diluent syringe into the vial, via the rubber cap (Fig 3) – at a 45° angle, with needle bevel uppermost. Changing the angle to 90° as the needle pushes through is considered to minimise coring, in which rubber is forced into the lumen of the needle with the resultant risk that it may then be injected into the patient (Dougherty and Lister, 2004);
- Inject the diluent, ensuring that it does not rise above the tip of the venting needle;
- Remove the diluent syringe and needle. The venting needle can be covered with an alcohol wipe;
- Agitate the vial to reconstitute the drug, taking care to avoid any spillage from the venting needle;
- Inspect the drug to ensure it has taken on the characteristics outlined in the manufacturer’s instructions. Also ensure that there is no particulate contamination (Fig 4);
- Insert the syringe and withdraw the required amount of the drug, tilting the vial to one side if necessary (Fig 5);
- Expel any air from the syringe either into the vial (by inverting the vial) or into a sheathed needle (Fig 6).

Glass ampoules

The procedure for glass ampoules is similar to that for rubber-capped vials with the following considerations:
- Tap the top of the ampoule to allow any trapped drug to drain into the bottom;
- Cover the top of the ampoule with gauze;
- Snap the top using a dot marker as a guide if appropriate. Some ampoules may require the application of a file to snap the neck, although the dot marker has minimised this;
- Carefully inspect the drug in order to check for glass and particulate contamination.

REFERENCES


PROFESSIONAL RESPONSIBILITIES

All nurses who prepare drugs for IV administration must have received approved training and demonstrated competence under supervision. The onus is also on the individual to ensure knowledge and skills are maintained both from a theoretical and practical perspective. Nurses should also undertake this role in accordance with their organisation’s protocols, policies and guidelines.