



**COVID19:
NIVAS Gravity infusion and Bolus IV drug
administration guidance**

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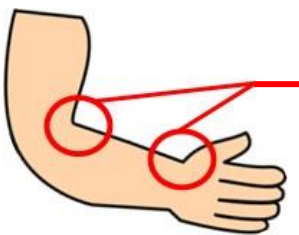
Charring Cross Hospital

NIVAS Gravity infusion IV drug administration guidance.

In response to the latest COVID19 pandemic, hospitals are creating additional critical care bed capacity. Alongside this the administration of IV therapy will be integral to treating patients. There may be a shortage of infusion pumps and syringe pumps, the following advice is offered from the National Infusion and Vascular Access Society (NIVAS) of the UK alongside the MEDUSA Online Injectible Medicines Guide.

Organisations should consider taking an inventory of all IV infusion pumps and syringe pumps. In the event of a shortage all infusion devices should be reserved for level one and above critical care areas for multiple pumped medications. It will be essential for clinical areas providing artificial ventilation and other critical care to have sufficient numbers of infusion pumps and syringe pumps. In this situation level 0 inpatient areas will find they do not have access to infusion devices therefore it is important to consider the following actions which may help if infusion pumps are not available.

Peripheral cannula inserted in points of flexion such as the ante cubital fossa or wrist should be avoided if possible. Administering gravity infusions at these points of flexion via a peripheral cannula can lead to complications such as phlebitis or infiltration (Bitmead and Oliver 2018). If a cannula must be placed in a point of flexion its use should be closely monitored.



Peripheral Cannula in points of flexion can cause complications and make gravity infusions difficult as occlusion is common (Barton et al 2017).

Administration of vesicants should be avoided in peripheral cannula placed over points of flexion (Rickard et al 2012).

In the event of an infusion pump not being available.

For individual drug administration information from the NHS Specialist Pharmacy Service and the MEDUSA team has provided specific COVID19 information which can be accessed via the following the link below:

<https://www.sps.nhs.uk/articles/use-of-gravity-infusions-and-bolus-injections-in-adults-during-covid-19/>

- The Medusa online Injectible Medicines Guide gives information on individual medicines and how to administer them. If you do not have access to this resource contact your local chief pharmacist
- In the event of no infusion pumps or syringe pumps being available you must consult your organisation's pharmacy for advice about alternative methods of administration.

- If the IV medication can be given safely as a bolus uses this method. Bolus IV therapy should be administered slowly over at least 3 minute.
- For general ward patients all IV infusions of fluids such as Plasmalite and sodium chloride 0.9% should be administered using a gravity infusion set and the drip rate calculated manually.
- Fillable elastomeric pumps can be considered in some situations

Calculating drip rates for gravity infusions.

To calculate the intended drip-rate of a gravity infusion you need to divide the total volume of fluid (in milliliters) by the total time required for the delivery (in hours) and then multiply by the drop factor (number of drops per ml). This gives you the total number of drops required per hour. To convert this to drops per minute, you need to divide by 60.

Drop factor = the number of drops it takes to make up one ml of fluid.

Two common sizes/drop factors are:

- 20 drops per ml (typically for clear fluids)
- 15 drops per ml (typically for thicker substances, such as blood)

The equation is as follows.

<p>Drops per minute = Total Volume (ml) / Total time in hours = Hourly flow rate Hourly flow rate / 60mins = Rate per min Rate per min x Drops per ml = Drip rate.</p>

Example: For 1 litre of 0.9% Sodium Chloride over 8 hours:

$$\frac{1000ml}{8hrs} = 125ml/hr \qquad \frac{125ml}{60min} = 2.08ml/min$$

$$2.08ml/min \times 20 \text{ drops/ml} = 41.6 \text{ drops per minute}$$

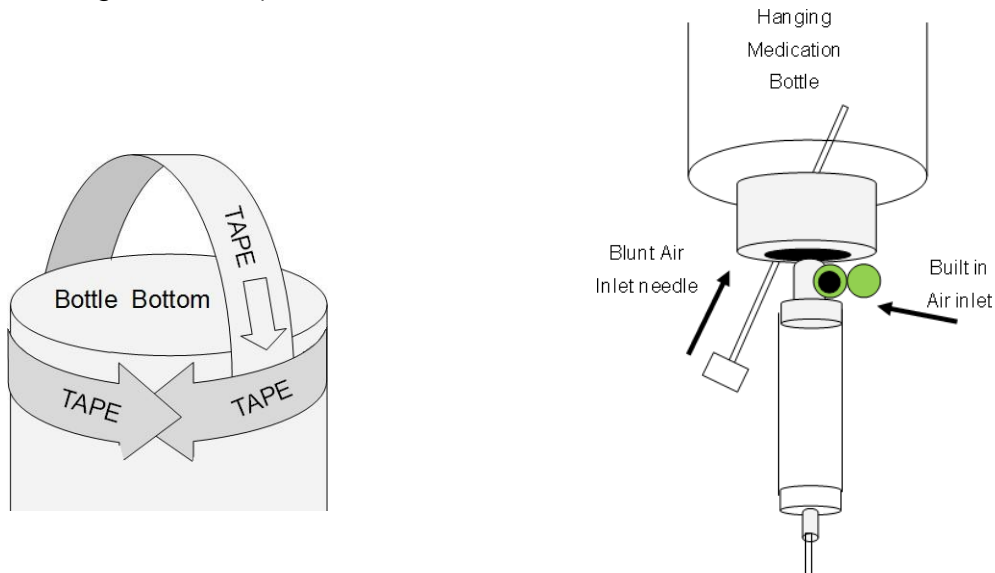
This is closest to **42 drops per minute** so you would run the infusion at a 42 drops per minute rate

Apple and Android apps are available to help calculate drip rates.

The following link gives access to a paper on app usage.

http://scholar.google.com/scholar_url?url=https%3A%2F%2Fpdfs.semanticscholar.org%2F7089%2Ffeeb455c043d70f00886f665b760706edccae.pdf&hl=en&sa=T&oi=ggp&ct=res&cd=4&d=6521289304384468432&ei=c6WAXpKHMZywSJ5anADA&scisig=AAGBfm0U8-wgnx1_c6amouradSXmjQsbbQ&noss=1&ws=1113x585&at=Managing%20Gravity%20Infusion%20Using%20a%20Mobile%20App&bn=1

Some IV therapy which is reconstituted in larger glass bottles such as IV Paracetamol and other medications can be administered using a gravity infusion set over 20 to 60 minutes, if the giving set has a built in air inlet this should be used or a blunt air inlet needle may be required. If the bottle does not have a hanging feature, clinical tape can be used to fashion a hanging device over the bottom of the bottle. (see diagram below)



- IV antibiotics should be given as a bolus if it is safe to do so and this information will be available on the MEDUSA injectable medicines guide or from your organisations pharmacy. Some antibiotics can be given as bolus off license and pharmacy can advise about this.
- Vesicants should be administered as an infusion via a pump if possible. If a pump is not available, bolus administration can be used to slowly administer over 5 mins via a small peripheral cannula sited in a big vein as far down the arm away from points of flexion if possible (Ford 2019), checking for signs of phlebitis constantly during the administration. (McGowan 2014)
- For vesicants a central venous catheter would be the preferred device for administration although there may be some issues with gravity infusion administration through a PICC due to the small lumen of the catheter (Duwadi et al 2019).
- Infusions with additives running longer than an hour via a gravity set should be checked hourly if possible in the same way as a pumped infusion.
- Parenteral nutrition must be given via an infusion pump (Guenter et al 2019).
- Blood transfusions can be given via a blood gravity infusion set.
- Chemotherapy administration should follow local oncology guidelines
- Paediatric IV therapy administration should follow local paediatric department guidelines

For further advice or information please contact:

www.NIVAS.org.uk

<https://www.sps.nhs.uk/articles/use-of-gravity-infusions-and-bolus-injections-in-adults-during-covid-19/>

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