Vasoactive IV Drip Calculations

It's not as bad as you think!

Manual Calculations

• Why???
  - Computer Dependence
    • If the computer doesn't work we still need to provide medication to patients.
  - Emergency
    • Sometimes there is not enough time to access the computer
    • You may be in transport or off of your unit.
  - The Double Check
    • It is never okay to make a medication error. ALWAYS double check your calculations!!!
Policy and Procedure

- Dosages will be administered according to patients dry or admission weight.
- Calculations can be obtained by utilizing the SMS Invision system, Marquette dose calculation screen or use Vasoactive IV drip calculation formulas.

Calculation Types

- **MCG/KG/MIN** (Wt. Dosed, 1 kg = 2.2lb)
  - Dopamine, Dobutamine, Inocor (Amrinone), Nipride.
- **MCG/MIN**
  - Nitroglycerin, Epinephrine, Isuprel, Levophed, Nooxygen
- **MG/MIN**
  - Amiodarone, Lidocaine, and Pronestyl

**MCG/KG/MIN**

1. To calculate for Dobutamine, Dopamine, Inocor (Amrinone), Nipride:
   - A. Desired mcg/kg/min x wt(kg) x cc x 60 = cc/hr
     mg 1000 (set pump to infuse)
   - B. cc/hr x mg x 1000 = mcg/kg/min
     Wt.(kg) cc 60
MCG/MIN

2. To Calculate for Epinephrine, Isuprel, Levophed, Neosynephrine, and Nitroglycerin.
   - A. Desired mcg/min x cc x 60 = cc/hr mg 1000 (set pump to infuse)
   - B. cc/hr x mg x 1000 = mcg/min cc 60

MG/MIN

3. To calculate for Amiodarone, Lidocaine and Pronestyl
   - A. Desired mg/min x cc x 60 = cc/hr (set pump mg to infuse)
   - B. cc/hr x mg x 1 = mg/min cc 60

Calculating Formulas

- Let’s try some calculations
Calculating Formulas

- After returning from the ICU post-surgery, your patient begins to have frequent episodes of multifocal PVC's. After a short run of Ventricular Tachycardia, the patient is bolus with Amiodarone 150mg/100cc D5W over 10 minutes. The physician then orders an Amiodarone drip to be initiated at 0.5 mg/min. Your Amiodarone drip arrives stat from pharmacy mixed as 900mg/500cc D5W. How many cc/hr would you initiate the drip at, in order to administer the prescribed amount?

\[
\frac{cc}{hr} = \frac{0.5 \, mg}{min} \times \frac{500 \, cc}{900 \, mg} \times \frac{60 \, min}{1 \, hr} = 16.6 \, cc/hr
\]

\[
\text{ANSWER} = 17 \, cc/hr
\]

Amiodarone (mg/min)

- Formula:
- Desired mg/min x cc x 60 = cc/hr

\[
\frac{mg}{min} = \frac{0.5 \, mg}{500 \, cc} \times \frac{60 \, min}{900 \, mg}
\]

\[
= \frac{0.5 \times 0.555 \times 60}{900} = \frac{1.665}{900}
\]

\[
\text{ANSWER} = 17 \, cc/hr
\]

Calculating Formulas

- In a hypotensive crisis, the MD writes an order: Initiate Dopamine drip stat. Mix 800 mg of Dopamine in 500 cc's of D5W. Infuse drip at 15 mcg/kg/min. How many cc/hr would you set the Imed pump at? The patient's chart lists the patient's weight at 180 pounds.

\[
\frac{180 \, lbs}{2 \, l} = 92 \, kg
\]

\[
\frac{(15 \, mcg/kg/min) \times (92 \, kg)}{(1 \, hr)} = \frac{1230 \, mcg/min}{60 \, min} \times \frac{500 \, cc}{900 \, mg} \times \frac{1 \, mcg}{1 \, mg} = 46 \, cc/hr
\]

\[
\text{ANSWER} = 46 \, cc/hr
\]
Dopamine (mcg/kg/min)

- Formula:
  - Desired mcg/kg/min x Wt.(kg) x cc x 60 = cc/hr
  - mg 1000
  - 15 mcg/kg/min x 180 lb x 500 cc x 60 = cc/hr
  - 2.2 800 mg 1000
  - 15 x 82 x 0.625 x 0.06 =
  - ANSWER: 46 cc/hr

Calculating Formulas

- After receiving report in the MICU, you perform your patient assessment. The patient is stable and you notice a Dopamine drip (800mg/500cc) infusing at 30 cc/hr via the IMED pump. The patients chart reveals a weight of 50 kg. How many mcg/kg/min of dopamine is the patient receiving?

Dopamine (mcg/kg/min)

- Formula:
  - cc/hr x mg x 1000 = mcg/kg/min
  - wt(kg) cc 60
  - 30 cc/hr x 800 mg x 1000 = mcg/kg/min
  - 50kg 500 cc 60
  - 0.6 x 1.6 x 16.66 =
  - Answer: 16 mcg/kg/min
Practice Problems

- Take a shot at the following practice problems.

Practice Problems

- Your patient returns from AICU and begins to have frequent episodes of PAT. The MD orders a Procainamide Hydrochloride drip to begin at 3 mg/min. The patient is fluid restricted and the MD orders 4 GMS in 500cc of D5W. How many cc/hr do you set the IMED pump to deliver 3mg/min?

Procainamide Hydrochloride mg/min

- Formula: Desired mg/min x cc x 60 = cc/hr
- 3 mg/min x 500cc x 60 = cc/hr
- 3 mg/min x 500cc x 60 = cc/hr
- 3 x 0.125 x 60 =
- Answer = 23 cc/hr
Practice Problems

• Your patient is in severe hypertensive crisis with a BP of 240/160. The MD orders a Nipride drip. Nipride 50mg in 250 cc of D5W to infuse at 0.5 mcg/kg/min, titrate to a MAP of 100. The patient weighs 150 lbs. How many cc/hr do you set the IMED pump to administer the prescribed dose?

\[
\text{cc/hr} = \frac{(250 \text{ cc})}{(50 \text{ mg})} \times \frac{(0.5 \text{ mcg/kg/min})}{(1 \text{ hr})} \times \frac{(60 \text{ min})}{(1 \text{ hr})} \times \frac{(1 \text{ kg})}{(1000 \text{ g})} \\
\]

\[
\frac{250}{50} = 5 \times 0.5 \times 60 \times 1000 \times 150 = 1.2 \times 10^6 \\
\frac{150 \text{ lbs}}{2.2 \text{ kg/lb}} = 68.18 \text{ kg}
\]

- Answer: 1.2 cc/hr

---

Nipride (mcg/kg/min)

• Formula:
  Desired mcg/kg/min x Wt.(kg) x cc x 60 = cc/hr
  mg 1000

  0.5 mcg/kg/min x 150 lb x 250 cc x 60 = cc/hr
  2.2 50 mg 1000

  0.5 x 68 x 5 x 0.06 =

  Answer: 10 cc/hr

---

Practice Problems

• During report you are told that your patient is receiving Levophed secondary to cardiogenic shock at 8 mcg/min. You examine your patient and make note that Levophed 4 mg in 250cc of D5W is infusing at 3 cc/hr via the IMED pump. Is your patient receiving the dose reported to you? What is your next course of action?

\[
\text{mcg/min} = \frac{(250 \text{ cc})}{(4 \text{ hrs})} \times \frac{(1 \text{ mg})}{(1000 \text{ mcg})} \times \frac{(3 \text{ cc})}{(1 \text{ hr})} \\
\frac{250}{4} = 62.5 \times 1000 \times 3 \times 60 \times 60 \\
\frac{1 \text{ mg}}{4 \text{ mg}} \times \frac{1000 \text{ mcg}}{1 \text{ mg}} \times \frac{250 \text{ cc}}{1 \text{ mg}} \times \frac{1 \text{ hr}}{60 \text{ min}}
\]

\[
= 0.8 \text{ mcg/min}
\]

---
Levophed (mcg/min)

- Formula:
  - \( \text{cc/hr} \times \frac{\text{mg}}{\text{cc}} \times 1000 = \text{mcg/min} \)
  - \( 3 \text{ cc/hr} \times \frac{4 \text{mg}}{250 \text{cc}} \times 1000 = \text{mcg/min} \)
  - \( 3 \times 0.016 \times 16.66 = \)
  - Answer = 0.8 mcg/min

Practice Problems

- Your patient begins to experience chest pain. You immediately notify the MD and a Nitroglycerin drip is ordered to start at 50 mcg/min. You mix 50 mg of Nitroglycerin in 250 cc of D5W and initiate therapy. How many cc/hr do you set the IMED at in order to administer the prescribed dose?

Nitroglycerin mcg/min

- Formula:
  - Desired mcg/min x \( \frac{\text{cc}}{\text{mg}} \times 60 = \text{cc/hr} \)
  - \( 50 \text{ mcg/min} \times \frac{50 \text{cc}}{50 \text{mg}} \times 60 = \text{cc/hr} \)
  - \( 50 \times 5 \times 0.06 = \)
  - Answer 15 cc/hr
Conversion Calculator

Conversion Calculator

Patient Weight: 75 Kilograms

Solution Conc: 2000 Mg in 300 mL

Press Enter to Perform Calculation

Lidocaine & Pronestyl
15 cc/hr = 1 mg/min

Conversion Calculator Display

Conversion Calculator

Patient Weight: 75 Kg

Solution Concentration: 2000 Mg in 300 mL

Press Enter to Perform Calculation

Conversion Calculator

Patient Weight: 75 Kilograms

Solution Conc: 2000 Mg in 300 mL

Press Enter to Perform Calculation
**Conversion Calculator Display**

Conversion Calculator 09/26/91 10:51

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<td>1600 Mcg in 1 ml</td>
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<td>1 cc/hr = 0.36 mcg/kg/min</td>
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LOCALMA

(Return)
VASOACTIVE IV DRIP CALCULATIONS

FORMULAS

1 kg = 2.2 lbs.

1. **To calculate Mcg./kg./min.**

   A. \( \frac{cc/hr \times mg \times 1000}{wt.(kg) \times cc} \times \frac{60}{1000} = mcg./kg/min. \)

   B. Desired mcg./kg/min. \times \frac{wt(kg)}{mg} \times \frac{cc}{60} \times \frac{1000}{1000} = cc/hr (to set pump on)

**Drugs infused in mcg./kg/min. include:**

- Dobutamine
- Inocor (Amrinone)
- Dopamine
- Nipride

2. **To calculate Mcg./min.**

   A. \( \frac{cc/hr \times mg}{cc} \times \frac{1000}{60} = mcg./min \)

   B. Desired mcg./min. \times \frac{cc}{mg} \times \frac{60}{1000} = cc/hr (to set pump on)

**Drugs infused in mcg./min. include:**

- Epinephrine
- Neosynephrine
- Isuprel
- Nitroglycerin
- Levophed

3. **To calculate Mg./min.**

   A. Desired mg./min. \times \frac{cc}{mg} \times 60 = cc/hr (to set pump on)

   B. \( \frac{cc/hr \times mg}{cc} \times \frac{60}{60} = Desired \ mg./min. \)

**Drugs infused in mg./min. include:**

- Bretylium
- Pronestyl
- Lidocaine
Drug Calculation Handout

1. Initiate a Dopamine drip 800mg/500cc D5W to infuse at 15 mcg/kg/min. Pt weighs 75 kg.

\[ \text{ml/hr} = \left( \frac{15 \text{ mcg}}{1 \text{ mg}} \right) \left( \frac{1 \text{ min}}{60 \text{ sec}} \right) \left( \frac{1 \text{ hr}}{60 \text{ min}} \right) \left( \frac{75 \text{ kg}}{1000 \text{ mL}} \right) \]

2. Your patient is receiving Nitroglycerin 50mg/250cc D5W at 10 cc/hr. The physician writes an order to increase Nitroglycerin to 40 mcg/min. Your patient weighs 110 lbs. How much Nitroglycerin is your patient currently receiving? What will you set the IMED pump at to infuse at 40 mcg/min?

\[ \text{cc/hr} = \left( \frac{250 \text{ cc}}{10 \text{ cc}} \right) \left( \frac{1 \text{ hr}}{1 \text{ day}} \right) \left( \frac{50 \text{ kg}}{1 \text{ day}} \right) \left( \frac{1 \text{ mg}}{40 \text{ mcg}} \right) \left( \frac{1 \text{ hr}}{60 \text{ min}} \right) \]

3. Initiate a Lidocaine drip 2gms/500cc D5W to infuse at 4 mg/min. Pt weighs 80 kg.

\[ \text{ml/hr} = \left( \frac{500 \text{ cc}}{2 \text{ g}} \right) \left( \frac{4 \text{ mg}}{1 \text{ mm}} \right) \left( \frac{1 \text{ g}}{100 \text{ mg}} \right) \left( \frac{60 \text{ min}}{1 \text{ hr}} \right) \]

4. Your patient is experiencing Rapid Atrial Fibrillation at a rate of 140. The physician orders a Cardizem drip 125mg/125cc of D5W to infuse at 5 mg/hr. What do you set the IMED pump at?

\[ \frac{125 \text{ cc}}{125 \text{ mg}} = \frac{1 \text{ cc}}{1 \text{ mg}} \]

\[ \text{cc/hr} = \left( \frac{125 \text{ cc}}{125 \text{ mg}} \right) \left( \frac{5 \text{ mg}}{1 \text{ hr}} \right) = 5 \text{ cc/hr} \]
5. Status post cardiac arrest the physician orders an Epinephrine drip 4mg/250cc D5W to infuse at 2 mcg/min. The patient's weight is estimated at 100 kg. How many cc/hr do you set the IMED pump to infuse at?

\[
\frac{cc}{hr} = \left(\frac{2.50 cc}{4 mg}\right) \left(\frac{2 mcg}{min}\right) \left(\frac{60 min}{1 hr}\right) \left(\frac{1 mcg}{1000 mcg}\right)
\]

6. Upon receiving your patient you observe Dobutamine 500mg/250cc infusing at 27 cc/hr via the IMED pump. The patient weighs 132 lb. How many mcg/kg/min of Dobutamine is your patient receiving?

\[
\frac{mcg}{(kg)(min)} = \left(\frac{500 mg}{2.50 cc}\right) \left(\frac{600 mcg}{1 mg}\right) \left(\frac{2.75 cc}{1 hr}\right) \left(\frac{1 hr}{60 min}\right)
\]

7. Status post cardiac catheterization you assume care of a patient receiving Amiodarone 900mg/500cc D5W at 33 cc/hr. The patient weighs 75 kg. The cardiologist arrives at the bedside and asks you, "How many mg/min of Amiodarone is the patient receiving?"

8. Your patient is receiving Neosynephrine 10mg/250cc D5W at 150 cc/hr. The patient weighs 55 kg. How many mcg/min of Neosynephrine is your patient receiving?
9. During rounds the cardiologist asks you how many mg/min of Pronestyl your patient is receiving? You note the IV bag says Pronestyl 2gm/500cc D5W and the IMED pump reads 30 cc/hr. Your answer to the cardiologist would be?

10. Your 90kg patient is in hypertensive crisis and is receiving Nipride 50mg/250cc D5W at 41 cc/hr. The physician has written an order to titrate the Nipride to 2 mcg/kg/min. What dose of medication is your patient receiving now? How many cc/hr will you set the IMED pump for to administer the new dose ordered?
Drug Calculation Answer Key

1. Formula: desired mcg/kg/min x wt(kg) x \( \frac{cc}{mg} \times 60 = cc/hr \)

\[
15 \text{ mcg/kg/min} \times 75\text{kg} \times \frac{500\text{cc}}{800\text{mg}} \times 60 = \frac{1000}{1000}
\]

\[
15 \times 75 \times 0.625 \times 0.06 = \quad \text{Answer} = 42 \text{ cc/hr}
\]

2. Part A: Formula: \( \frac{cc}{hr} \times \frac{mg}{60} \times 1000 = \text{mcg/min} \)

\[
10\text{cc/hr} \times \frac{50\text{mg}}{250\text{cc}} \times 1000 = \frac{60}{60}
\]

\[
10 \times 0.2 \times 16.66 = \quad \text{Answer} = 33 \text{ mcg/min}
\]

Part B: Formula: desired mcg/min x \( \frac{cc}{mg} \times 60 = \text{cc/hr} \)

\[
40 \text{ mcg/min} \times \frac{250\text{cc}}{50\text{mg}} \times 60 = \frac{1000}{1000}
\]

\[
40 \times 5 \times 0.06 = \quad \text{Answer} = 12 \text{ cc/hr}
\]

3. Formula: desired mg/min x \( \frac{cc}{mg} \times 60 = \text{cc/hr} \)

\[
4 \text{ mg/min} \times \frac{500\text{cc}}{2\text{GM}} \times 60 = \frac{1000}{1000}
\]

\[
4 \times 0.25 \times 60 = \quad \text{Answer} = 60 \text{ cc/hr}
\]
4. Cardizem Drip 125 mg = 1 mg = 5 mg = set pump at 5 cc/hr
   125 cc = 1 cc = 5 cc

5. Formula: desired mcg/min x cc x 60 = cc/hr
   mg 1000

   2 mcg/min x 250cc x 60 =
   4mg 1000

   2 x 62.5 x 0.06 =

Answer = 7.5 cc/hr

6. Formula: cc/hr x mg x 1000 = mcg/kg/min
   wt(kg) cc 60

   27cc/hr x 500mg x 1000 =
   132 lb 250cc 60

   27cc/hr x 500mg x 1000 =
   60kg 250cc 60

   0.45 x 2 x 16.66 =

Answer = 15 mcg/kg/min

7. Formula: cc/hr x mg x 1 = mg/min
   cc 60

   33cc/hr x 900mg x 1 =
   500cc 60

   33 x 1.8 x 0.02 =

Answer: 1 mg/min

8. Formula: cc/hr x mg x 1000 = mcg/min
   cc 60

   150cc/hr x 10mg x 1000 =
   250cc 60

   150 x 0.04 x 16.66 =

Answer: 100 mcg/min
9. Formula: \[ \text{cc/hr} \times \frac{\text{mg}}{\text{cc}} \times \frac{1}{60} = \text{mg/min} \]
\[
30\text{cc/hr} \times \frac{2\text{GM}}{500\text{cc}} \times \frac{1}{60} = \]
\[
30\text{cc/hr} \times \frac{2000\text{mg}}{500\text{cc}} \times \frac{1}{60} = \]
\[
30 \times 4 \times 0.02 = \]

Answer = 2 mg/min

10. Part A: Formula: \[ \frac{\text{cc/hr}}{\text{wt(kg)}} \times \frac{\text{mg}}{\text{cc}} \times 1000 = \text{mcg/kg/min} \]
\[
\frac{41\text{cc/hr}}{90\text{kg}} \times \frac{50\text{mg}}{250\text{cc}} \times 1000 = \]
\[
0.45 \times 0.2 \times 16.66 = \]

Answer: 1.5 mcg/kg/min

Part B: Formula: desired \( \frac{\text{mcg/kg/min}}{\text{wt(kg)}} \times \frac{\text{cc}}{\text{mg}} \times 60 = \text{cc/hr} \)
\[
2\text{mcg/kg/min} \times 90\text{kg} \times \frac{250\text{cc}}{50\text{mg}} \times 60 = \]
\[
2 \times 90 \times 5 \times 0.06 = \]

Answer: 54 cc/hr