



Opioid Conversion Self-Assessment

Exercise 1: Opioid titration

Mr. White is taking 100 mg of sustained-release morphine every 12 hours. For the past two days, he has taken an additional eight, 15 mg doses of immediate-release morphine because his pain was not controlled.

What are his new sustained-release morphine and rescue (immediate release) doses?

Answer:

To determine his new sustained-release morphine dose, calculate the total opioid taken by adding the amount of sustained-release morphine and immediate-release morphine consumed in 24 hours. Divide this quantity by 2 and administer every 12 hours:

$$(100 \text{ mg} \times 2) + (15 \text{ mg} \times 8) = 320 \text{ mg}$$

$$320 \text{ mg} / 2 = 160 \text{ mg sustained-release morphine every 12 hours}$$

The new rescue dose of morphine is estimated as 10% of the new, total daily sustained-release dose:

$$320 \text{ mg} \times 0.10 = 30 \text{ mg of immediate-release morphine}$$

Exercise 2: Changing an oral opioid to the IV/SQ route

Ms. Brown was taking 150 mg oral sustained-release morphine every 12 hours. She developed a pathologic femoral fracture and has required additional 150 mg of oral immediate-release morphine daily for the past two days, achieving good pain control. She will go to the operating room tomorrow for internal fixation and will require intravenous pain control.

What is the parenteral morphine drip rate that is equivalent to the oral medication she currently takes? What is her new rescue dose and how often can it be given?

Answer:

Calculate the total amount of oral opioid taken per 24 hours:

$$(150 \text{ mg} \times 2) + (150 \text{ mg}) = 450 \text{ mg/day}$$

Use the “[Dosing and Conversion Chart for Opioid Analgesics](#)” to calculate the equivalent total daily parenteral morphine dose and divide that by 24 to derive the hourly drip rate.

From the “Dosing and Conversion Chart for Opioid Analgesics” the conversion ratio of oral to parenteral morphine is 30:10 (3:1):

$$450 \text{ mg} / 3 = 150 \text{ mg}$$

$$150 \text{ mg}/24 \text{ hours} = 6.25 \text{ mg/hour}$$

To determine the parenteral rescue dose, calculate 10% of the daily parenteral opioid dose:

$$150 \text{ mg} \times 0.10 = 15 \text{ mg}$$

The peak effect of intravenous morphine is reached in approximately 30 minutes. Provided there are no concerning side effects, the rescue dose can be given every 30 minutes until the pain is adequately controlled.

Exercise 3: Changing to another oral opioid

Ms. Reed is taking sustained-release oxycodone, 100 mg every 12 hours, but has developed intolerable sedation. She would like to try an immediate-release opioid agent, hydromorphone.

What is the equivalent dose of hydromorphone?**Answer:**

Patients can develop intolerable side effects to an individual opioid. In most cases, another opioid will not cause side effects to the same extent.

To make the change safely, you must prescribe the correct dose of the new agent. The “[Dosing and Conversion Chart for Opioid Analgesics](#)” will help you calculate the equivalent dose of the new opioid, but you must allow for the incomplete nature of cross tolerance to opioid side effects.

After patients take the same opioid dose for a week or two, they become tolerant of the opioid's sedative and respiratory depressive effects. When another opioid is substituted for the original opioid, patients will not be completely tolerant to the new opioid's side effects, which can lead to over-sedation or confusion. Respiratory depression is unusual except with methadone.

You must carefully calculate the equianalgesic dose of the new opioid, and then reduce the dose by 25%-50%.

The single exception to this rule is when prescribing fentanyl. The equianalgesic tables for fentanyl have been adjusted, so you can use the doses given in the "[Morphine to Fentanyl Equivalents](#)" conversion tables without further adjustment.

Calculate the total daily dose of oxycodone:

$$100 \text{ mg} \times 2 = 200 \text{ mg}$$

Use the "[Dosing and Conversion Chart for Opioid Analgesics](#)" to calculate the equivalent oral hydromorphone dose (the conversion ratio of oxycodone to hydromorphone is 20:7.5 (2.6:1):

$$200 \text{ mg oxycodone} / 2.6 = 77 \text{ mg oral hydromorphone (round off to 75 mg)}$$

Adjust the total 24-hour oral hydromorphone dose downward by 25%-50%:

$$75 \text{ mg} \times 2/3 = 50 \text{ mg}$$

Divide the total daily dose of hydromorphone into appropriate intermittent doses based upon the "[Dosing and Conversion Chart for Opioid Analgesics](#)":

$$50 \text{ mg} / 6 \text{ doses per day} \sim 8 \text{ mg every 4 hours}$$

Exercise 4: Changing from an oral opioid to transdermal fentanyl

Ms. Doe is taking 100 mg sustained-release morphine every 12 hours. She is having difficulty swallowing pills and would like to use transdermal fentanyl.

What is the equivalent dose of transdermal fentanyl?

Answer:

Calculate the total dose of oral sustained-release morphine:

$$100 \text{ mg} \times 2 = 200 \text{ mg/day}$$

Determine the equianalgesic dose of transdermal fentanyl by using the "[Morphine to Fentanyl Equivalents](#)" chart.

For a patient taking 100 mg sustained-release morphine every 12 h (200 mg daily) the equivalent fentanyl patch dose is 100 µg/h. Remember that the "Morphine to Fentanyl Equivalents" chart has already been adjusted for side-effect tolerance and presents the actual dose to be given to the patient.

Exercise 5: Change opioid agent and route

Mr. Topper is having nightmares and hallucinations on 150 mg oral sustained-release morphine twice per day. Because he is to be hospitalized for an operation, he will need a parenteral opioid. A decision is made to switch him to parenteral hydromorphone.

What is the equivalent mg/hour parenteral hydromorphone dose, and what is his rescue dose?

Answer:

Calculate the total sustained-release morphine dose:

$$150 \text{ mg} \times 2 = 300 \text{ mg per day}$$

Calculate the conversion from oral morphine to IV/SQ morphine using the “[Dosing and Conversion Chart for Opioid Analgesics](#)” (the conversion ratio of oral to parenteral morphine is 3:1):

$$300 \text{ mg sustained-release morphine per day} / 3 = 100 \text{ mg/day parenteral morphine}$$

Convert morphine to its equivalent hydromorphone dose using the “[Dosing and Conversion Chart for Opioid Analgesics](#)” (the conversion ratio of IV morphine to IV hydromorphone is 10:1.5 [6.6:1]):

$$100 \text{ mg IV morphine} / 6.6 = 15 \text{ mg IV hydromorphone}$$

Adjust the dose for incomplete cross tolerance by reducing by 25%-50%:

$$2/3 \text{ of } 15 \text{ mg} = 10 \text{ mg IV hydromorphone per day}$$

Divide dose by 24 to obtain dose per hour:

$$10 \text{ mg} / 24 \text{ hours} \sim 0.4 \text{ mg/hour hydromorphone}$$

Calculate rescue dose by multiplying total daily dose of hydromorphone by 10%:

$$10 \text{ mg} \times 0.10 = 1 \text{ mg}$$