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FAST FACTS AND CONCEPTS #2 (PDF)

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Quick—what dose of the transdermal fentanyl patch (Duragesic™) is equianalgesic to a 3 mg/hr morphine continuous infusion? Conversions to and from fentanyl transdermal are notoriously tricky, requiring knowledge of the published conversion data, general opioid pharmacology, and a generous dose of common sense. See also Fast Fact #36 on opioid dose conversions.

Step 1: Calculate the 24 hr morphine dose: $3 \text{ mg/hr} \times 24 \text{ hrs} = 72 \text{ mg IV morphine/24 hrs}$.

Step 2: Convert the IV dose to the equianalgesic oral morphine dose using a ratio of:
 $1 \text{ mg IV} = 3 \text{ mg oral}$. Thus, $72 \text{ mg IV} = 216 \text{ mg po/24 hours}$.

Step 3: Convert the oral morphine dose to transdermal fentanyl. There are two methods:

- Method 1 – Standard Table. Look up fentanyl transdermal in the PDR and find the morphine conversion table. It says that 135-224 mg of morphine per 24 hours = 50 mcg/hr patch. Note: this range of morphine is very broad which may result in significant under dosing.
- Method 2 - Alternate Formula. In 2000, Brietbart, et al published an alternative method, based on the results of a multi-center trial by Donner, et al, that relied on a fixed dose conversion ratio to calculate the fentanyl transdermal dose. Brietbart recommended the ratio of:

$0.2 \text{ mg oral morphine/24 hr} = 1 \text{ mcg/hr of transdermal fentanyl}$ —rounded to the nearest patch size.
In the case example above, 216 mg of oral morphine per day is approximately equianalgesic to the 100 mcg/hr fentanyl patch.

Note: using this formula, 25 mcg/hr of transdermal fentanyl is roughly equivalent to 50 mg oral morphine/24 hours. This dose may be excessive when used in an opioid naïve patient, particularly the elderly.

Key Considerations

1. All equianalgesic ratios/formulas are approximations; clinical judgment is needed when making dose or drug conversions.
2. The risk of sedation/respiratory depression with transdermal fentanyl is probably increased in the elderly or patients with liver and renal impairment due to its long half-life, thus, choose the lower end of the dosing spectrum.
3. When in doubt, go low and slow, using prn breakthrough doses generously while finding the optimal dosage of a long-acting drug.

Other teaching points about Duragesic:

- Start at the lowest dose, 12 mcg/hr, in an opioid naïve patient; there is no maximum dose.
- Therapeutic blood levels are not reached for 13-24 hours after patch application and drug will be continue to be released into the blood for at least 24 hours after patch removal.
- Opioid withdrawal symptoms can occur during dose conversions—care must be taken to avoid this by use of breakthrough opioids.
- Some patients will need to have their patches changed every 48 hours.
- The recommended upward dose titration interval is no more frequently than every 72 hours.
- Place patches on non-irradiated, hairless skin.

- Direct heat applied over the patch can increase drug absorption with increased toxic effects.
- There are no data that cachectic patients have reduced efficacy due to loss of subcutaneous fat

References

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