

## FAST FACTS AND CONCEPTS #2 CONVERTING TO TRANSDERMAL FENTANYL

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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 mg/hr x 24 hrs = 72 mg IV morphine/24 hrs.

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

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

- **Method 1 – Standard Table.** Look up the FDA prescribing information for transdermal fentanyl (Reference 1, pp 29-30). 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:
  - 2 mg oral morphine/24 hr = 1 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 the opioid naïve or the elderly.

### Key Considerations

1. All equianalgesic ratios/formulas are approximations; clinical judgment is needed when making dose or drug conversions.
2. The FDA Prescribing Information indicates that their table should only be used when converting *from* another opioid *to* transdermal fentanyl.
3. 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.
4. When in doubt, go low and slow, using prn breakthrough doses generously while finding the optimal dosage of a long-acting drug.
5. The 'Alternate Formula' by Brietbart, et al is best used by *experienced practitioners* as it tends to give higher fentanyl patch doses than the FDA PI.

### 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; albeit cachectic patients may require higher dosing (6).

**References:**

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