PALLIATIVE CARE NETWORK OF WISCONSIN

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

**David E Weissman MD and Drew A Rosielle MD**

**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:**


1. Duragesic Prescribing Information. US Food & Drug Administration. http://www.accessdata.fda.gov/drugsatfda_docs/label/2005/19813s039lbl.pdf. Accessed Nov 4, 2014.
2. Donner B, et al. Direct conversion from oral morphine to transdermal fentanyl. *Pain.* 1996; 64:527-534.
3. Payne R, et al. QOL and cancer pain: satisfaction and side effects with Transdermal fentanyl versus oral morphine. *J Clinical Oncology.* 1998:16:1588-1593.
4. Breitbart W. An alternative algorithm for dosing transdermal fentanyl for cancer-related pain. *Oncology*. 2000; 14:695-702.
5. Gourlay GK. Treatment of cancer pain with transdermal fentanyl. *The Lancet Oncology.* 2001; 2:165-172.
6. Heiskanen T, Matzke S, Haakana S et al. Transdermal fentanyl in cachectic cancer patients. *Pain*. 2009; 144:218-22. doi: 10.1016/j.pain.2009.04.012



**Version History**: This *Fast Fact* was originally edited by David E Weissman MD. 2nd Edition published July 2005; 3rd Edition May 2015. Current version re-copy-edited March 2009; information about the lowest patch dose added. Revised November 2014 by Drew A Rosielle MD; FDA reference updated; Reference 6 added; additional cautionary language added.