

Transdermal fentanyl patch in the use of chronic and non chronic pain



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What is Fentanyl?

Transdermal Fentanyl is a synthetic narcotic analgesic that is widely used in clinical anaesthesia which was originally synthesised by Dr Paul Janssen in the early sixties. It is approximately one hundred times more potent than morphine; which is thought of as the golden standard for opioids; this is where other opioids are compared and tested against morphine. Due to its potency, Fentanyl is mainly used for chronic long term illnesses such as cancer; however it is also used in short term acute pain for example child birth (a Fentanyl epidural would be used in this situation). Fentanyl can be administered in many ways, which include: patch, ionysys, lollipop, injection and epidural.

Biochemistry

Janssen's synthesis of fentanyl was to react N-phenethylpiperidone with aniline to create 4-anilino-N-phenethylpiperidine. This compound is then reacted with propionyl chloride to give pure fentanyl, which is toxic and must be diluted in order to administer to patients. American Chemical society 2005.

Transdermal Fentanyl works by binding itself to the μ -opioid receptors found in the Central Nervous System and the Gastro-Intestinal tract. It has high lipid solubility therefore it binds strongly to plasma proteins and can quickly cross the blood-brain barrier. This in turn causes the patient to have a sense of euphoria by increasing the patient's pain threshold (the amount of discomfort a person feels enough to consider pain) and reducing the sensitivity of pain.

Side effects and Benefits

Transdermal Fentanyl is a more popular choice among patients as it provides a better quality of life and produces fewer side effects compared to that of other opioids. The side effects of Fentanyl are generic for all opioids, these include; respiratory depression (where the patient's breathing becomes depressed and slow) muscle spasms, abnormal blood pressure (could be both high or low), nausea, vomiting, blurred vision, itching (caused by the substance making direct contact with the skin), euphoria, dizziness, weight loss and constipation.

On the other hand there are many benefits that come from using the drug, example; A longer period of release i. e. Fentanyl patch can be released throughout the body for a seventy two hour period using the patch; and according to clinical studies provides an improved pain relief compared to that of morphine. A smaller volume is needed due to its potency and less constipation and less sedation occurs (the patient recovers motor function quicker).

Converting a patient onto Transdermal Fentanyl Patch from Morphine

The direct adaptation from Morphine to Fentanyl was first determined and tried by cancer patients. These patients are seen to have a steady and unvarying level of pain, and are receiving a constant dosage of Morphine to relieve it. On unstable pain Fentanyl does not work at its best.

Below is an example of a patient receiving 100mg IV Morphine Sulphate and is going home on Fentanyl patch.

1) Convert to 24h oral MS dose

100mg/ IV MS

=

x

10mg/d IV MS

30m

MS

2) Adjust for cross-Tolerance

300mg/d oral MS x 0.65† = 200mg/d oral MS

† Deriving a 35% reduction is equivalent to multiplying by 0.

65

3) Convert adjusting to dose to Fentanyl Transdermal Patch dose

200mg/d oral MS =

55µ/hr Fentanyl
Patch

3.6

4) Round to closest Fentanyl Patch dosage from (25, 50, 75, 100)

55µ/hr → 50µ/hr Fentanyl patch††

††Replace patch every 3 days

5) Provide oral morphine q2-4h for a break-through -pain at 10% of 24hr period total

$200\text{mg/d oral MS} \times 0.10 = 20\text{mg oral MS q2-4h prn}$
breakthrough pain

Ali Olyaei PharmD, 2005

Fentanyl patch

The Fentanyl patch is generally deliberated if there is no access oral for the patient and is unable to take Fentanyl orally in a tablet/lozenge form or If the patient is reluctant to continue on morphine to due unpleasant side effects such as constipation, tolerance; or if the patient is know to overdose or not taking the medication this is where the patient will become supervised.

The Transdermal Fentanyl patch is often seen as the most common and easy way to treat chronic and non-chronic pain. It allows the patient to self administer the drug at home and has the longest effect on the body.

(Margaret Gibbs 2009) The Patch can also be assisted by the lollipop, by using it as a top up mechanism to pain relief. Many health care professionals suggest that the patch should only be used for patients who are opioid-tolerant and cannot successfully manage there pain with other dugs such as morphine. The Patch can come in two forms which include; a Reservoir patch, where the patch is suspended in a matrix and placed onto the skin; and a Matrix patch where the drug is distributed evenly throughout a matrix.

Reservoir Patch

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The principle of this patch is to understand and evaluate the stability and skin penetration profiles of Fentanyl.

For this patch the Fentanyl is limited within a reservoir within the patch in a gel form.

Dangerous drugs, Justinian Lane 2010

Matrix Patch

Unlike the Reservoir patch there is no Fentanyl gel contained within the patch. This style of patch places the Fentanyl within the adhesive so it makes direct contact with the skin. (Causing the side effect of itching). This design of patch is seen as safer as is it unable to leak gel. Dangerous drugs, Justinian Lane 2010

How to apply the Patch

There are many guidelines according to Drug and Therapeutics Committee August 2009; that a patient is required to follow in order to use the patch successfully.

* Apply to clean, hairless skin such as the upper arm (which has not exposed to radiotherapy) and seize in place for 1 minute.

* The patch works by creating a deposit of drug under the skin through the pores of the skin.

* The patch should be replaced every 72 hours. Rotate position so not to irritate the skin.

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- * Avoid direct heat – and if the patient has a fever observe for opioid toxicity.
- * Fentanyl causes less constipation than morphine. Therefore use half the dose of laxative if needed and repeat.
- * Prescribe strong opioid for breakthrough with either immediate release morphine sulphate /oxycodone or subcutaneous strong opioid

The Patch works by releasing Fentanyl (either from the matrix gel or the Fentanyl Adhesive) into the body fats through the pores of the skin, which in turn releases the drug slowly and constantly around the bloodstream eventually passing the blood brain barrier allowing it to bind to μ -opioid receptors, giving a constant pain relief of between forty-eight and seventy-two hours which is usually constant. However, it takes approximately four-twelve hours for the patch to begin releasing Fentanyl into the body. At this point the Fentanyl lollipop would be used to keep the patients pain relief up.

Dosage is based on the size of the patch and absorption rate is usually regular, depending on many factors which include body temperature, size of the patient, skin type, quantity of body fat, and placement of the patch; can all have major effects on pain relief and dosage.

Fentanyl patches are manufactured in five sizes: 12.5 $\mu\text{g}/\text{h}$, 25 $\mu\text{g}/\text{h}$, 50 $\mu\text{g}/\text{h}$, 75 $\mu\text{g}/\text{h}$ and 100 $\mu\text{g}/\text{h}$.

Fentanyl Lollipop

The Transdermal Fentanyl Lollipop is a fast and effective method of administering the drug, as the drug enters the body via mucous membranes in the mouth. It is primarily used as a “top up” method of pain relief in <https://assignbuster.com/transdermal-fentanyl-patch-in-the-use-of-chronic-and-non-chronic-pain/>

in conjunction to the Fentanyl Patch, when the patient requires it. It is an beneficial form of administration as the lollipop doesn't require trained medical staff regarding administration Richard Payne et al. It is preferred among patient as it is portable and fast-acting. The dosages for the lollipop are the following:

- 200 µg in gray
- 400 µg in blue
- 600 µg in orange
- 800 µg in purple
- 1200 µg in green
- 1600 µg in burgundy

Fentanyl is prescribed after an assessment of the patient's condition, medical history and known tolerance to pain medication, such as Morphine. In addition, the dosage is decided based on the severity of the pain over a twenty-four hour period.

Conclusion

To summarise Transdermal Fentanyl is a potent synthetic analgesic which was manufactured for the treatment of both chronic and non chronic pain management which include situations such as cancer or childbirth. It is widely used for the treatment of cancer as is it approximately one hundred times more potent than morphine which is described as the " golden standard" for opioids. The Fentanyl patch is manufactured in two different <https://assignbuster.com/transdermal-fentanyl-patch-in-the-use-of-chronic-and-non-chronic-pain/>

styles; Matrix and Reservoir; they work by diffusing the drug through the pores of the skin and allowing it to be transported around the body's blood system furthermore crossing the blood barrier binding to the μ -opioid receptors. The lollipop as a top up mechanism in conjunction according to the patient's pain level. The patch is effective and preferred by patients as it has fewer side effects than the majority of opioids i. e. morphine, and provides the patient with a better quality of life as it can be administered at home and last for approximately seventy-two hours.

References

~ Margaret Gibbs, The role of transdermal fentanyl patches in the effective management of cancer pain [http, \(June 2009\) ://www. internurse. com](http://www.internurse.com) - Last accessed 1st December 2009

~ Last accessed 1st march 2010 (Online) [http://www. medicinenet. com/fentanyl_transdermal_system/article. htm](http://www.medicinenet.com/fentanyl_transdermal_system/article.htm)

~ Figure 1 (online) [http://pubs. acs. org/cen/img/83/i25/8325fentanyl. gif](http://pubs.acs.org/cen/img/83/i25/8325fentanyl.gif)

~ American Chemical society 2005 (online) Last accessed 10th March 2010 [http://pubs. acs. org/cen/coverstory/83/8325/8325fentanyl. html](http://pubs.acs.org/cen/coverstory/83/8325/8325fentanyl.html)

~ Drug and Therapeutics Committee August 2009 (online) Last accessed 12th March 2010 [http://www. typepad. com/services/trackback/6a00d8341c716c53ef011571115245970c](http://www.typepad.com/services/trackback/6a00d8341c716c53ef011571115245970c)

~ Figure 2 (online) [http://corpreform. typepad. com/.](http://corpreform.typepad.com/a/6a00d8341c716c53ef01157205fb1a970b-pi)
[a/6a00d8341c716c53ef01157205fb1a970b-pi](http://corpreform.typepad.com/a/6a00d8341c716c53ef01157205fb1a970b-pi)

<https://assignbuster.com/transdermal-fentanyl-patch-in-the-use-of-chronic-and-non-chronic-pain/>

~ Figure 3 (online) <http://corpreform.typepad.com/>.

[a/6a00d8341c716c53ef01157205fb2a970b-pi](http://corpreform.typepad.com/a/6a00d8341c716c53ef01157205fb2a970b-pi)

~ Figure 4 (online) http://pi.watson.com/product_shot_images/00591_3213_72.jpg

[com/product_shot_images/00591_3213_72.jpg](http://pi.watson.com/product_shot_images/00591_3213_72.jpg)

~ Last accessed 12th march 2010 (online) <http://www.fifeadtc.scot.nhs.uk/support/Fentanyl%20palliative%20care.pdf>

[uk/support/Fentanyl%20palliative%20care.pdf](http://www.fifeadtc.scot.nhs.uk/support/Fentanyl%20palliative%20care.pdf)

~ Last accessed 12th march 2010 (online) <http://www.typepad.com/services/trackback/6a00d8341c716c53ef011571115245970c>

[com/services/trackback/6a00d8341c716c53ef011571115245970c](http://www.typepad.com/services/trackback/6a00d8341c716c53ef011571115245970c)

~ Richard Payne et al (online) Oral transmucosal fentanyl citrate (OTFC) for

the treatment of breakthrough pain in cancer patients: a controlled dose

titration study, (1999) *Pain* 79 303-312, Last accessed www.sciencedirect.com

www.sciencedirect.com 21/01/2010