Journal Watch

Transdermal fentanyl in cachectic cancer patients

Heiskanen T, Mätzke S, Haakana S, et al. International Association for the Study of Pain 2009; 218-222.

Pain Clinic, Department of Anesthesiology and Intensive Care Medicine (T.H., S.H., E.K.), Helsinki University Central Hospital, Helsinski, Finland; Department of Clinical Physiology (S.M.), Jorvi Hospital, Espoo, Finland; Department of Forensic Medicine (M.G., E.V.), University of Helsinki, Helsinki, Finland; Institute of Clinical Medicine (E.K.), University of Helsinki, Helsinki, Finland.

Prepared by: Yoko Tarumi, M.D.

Received during: The Monthly Journal Club (September 14, 2010), the Cross Cancer Institute

Abstract:

Fentanyl is an opioid with high lipid solubility, suitable for intravenous, spinal, transmucosal and transdermal administration. The transdermal fentanyl patch has become widely used in the treatment of both malignant and non-malignant chronic pain. The absorption of fentanyl from the patch is governed by the surface area of the patch, by skin permeability and by local blood flow. The aim of this study is to find out whether absorption of fentanyl in cachectic patients with cancer-related pain is different from that of normal weight cancer patients. We recruited ten normal weight (mean body mass index (BMI) 23 kg/m^2) and ten cachectic (mean BMI to 16 kg/m^2) cancer pain patients. A transdermal fentanyl patch with a dose approximately equinalgesic to the patients' previous opioid dose was administered to the upper arm of the patient for 3 days. Prior to patch application, the height, weight and BMI of the patient, as well as upper arm skin temperature, local swelling, thickness of skin fold and local blood flow were measured. Plasma fentanyl concentrations were analyzed from blood samples taken at baseline, 4, 24, 48 and 72 h. Plasma fentanyl concentrations adjusted to dose were significantly lower at 48 and 72 h in cachectic patients than normal weight patients. The cachectic patients had a significantly thinner upper arm skin fold, but no differences were found in local blood flow, sweating, or skin temperature. Absorption of transdermal fentanyl is impaired in cachectic patients compared with that of normal weight cancer pain patients.

Comments:

Strengths:

Important pharmacokinetic information is often very limited when managing cancer pain. This is especially the case with long acting formulations such as fentanyl transdermal system, which are methodologically challenging to study. This study examined the excellent hypothesis by demonstrating that fentanyl, which is a highly lipophilic opioid, has different pharmacokinetics in cachectic patients.

Weakness:

As the authors commented, this study was open-label in design, and the types of opioids that were administered to study participants varied. The switching phase and observation phase were only 72 hours long, and it is unclear as how the titration was performed without any adjustment phase. The number of participants was relatively small, which would limit generalizability of the findings. Very limited information was provided regarding pathophysiology of pain.

Relevance to Palliative Care:

Based on our clinical impression of unsuccessful analgesic outcome with fentanyl transdermal system, use of this drug for management of pain in the palliative population has not been a standard practice in our program. By improving our understanding of its pharmacokinetics, it may be possible to identify the population that may experience analgesic benefit from fentanyl transdermal system. This study provides significant insight into how different body mass may contribute to variable pharmacokinetics of fentanyl transdermal system.