Canterbury District Health Board
Te Poari Hauora ō Waitaha

Clinical Pharmacology Bulletin

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Transdermal patches: MRI safety concerns

Patients should be asked if they are wearing a transdermal patch prior to a magnetic resonance imaging (MRI) scan.

Background

A recent case of possible fentanyl toxicity in a patient wearing a transdermal patch during an MRI highlighted the safety issues associated with medication patches in MRI scans. Safety concerns include the potential for skin burns during an MRI due to metallic components in the patch, increased drug dose due to increased heat and the patch not being reapplied after removal.

Metal – can cause skin burns

Patches that contain metal (e.g. aluminium foil) must be removed. Case reports have showed that serious skin burns can occur. Metal in the patch acts as a conductor which induces an electric current resulting in intense heat and burning. Some patches contain metal which is not visible. If there is any doubt about the metal content, patches should be removed. See table below.

Heat – increases drug absorption

Local heat has been shown to increase drug absorption from transdermal patches (an increase in dose rate).

Any heating of non-metallic patches during an MRI is likely to be only a few degrees for 15 to 60 minutes and, is unlikely, to be of clinical significance (except possibly fentanyl). Any increase in absorption will decrease once the heat source is removed.

Additive pharmacodynamic effects

Some patients having an MRI scan require sedation e.g. midazolam. The risk of sedation is increased in patients on opioids e.g. fentanyl.

Transdermal fentanyl

A study compared the administration of a 25 mcg/hour fentanyl patch with local heat (42°C ± 2°C) for 4 hours with no heat. It found a three fold increase in the maximum fentanyl concentration (Cmax). This is potentially significant in some patients. The average concentration over 24 hours (AUC) was not affected.

Neither the Sandoz nor Mylan brand of transdermal fentanyl contain metal and therefore, should not require removal prior to MRI. However, as fentanyl is a potent opioid consider removal of the patch if it is within the MRI field and the patient is at risk of toxicity e.g. frail or requires sedation. If the patient experiences symptoms of opioid toxicity the patch should be removed immediately.

Unnecessary removal of patches

Not all patches need to be removed. If the body part with the patch is not within the MRI field there is no risk to the patient (e.g. a patch applied to the torso and an MRI of the brain).

Table: Metal content of transdermal patches

Transdermal patch	Brand	Metal
Metal containing transdermal patches		
Buprenorphine	Norspan®	Yes
Clonidine	Catapres®-TTS®	Yes
Glyceryl trinitrate	Nitroderm TTS®	Yes
Hyoscine hydrobromide	Scopoderm TTS®	Yes
Hyoscine hydrobromide	Transderm Scōp®	Yes
Nicotine	Habitrol®	Yes
Nicotine	Nicorette® Nicotrol®	Yes
Nicotine	Nicabate Clear®	Yes
Testosterone	Androderm® Andropatch®	Yes
Non-Metal containing transdermal patches		
Estradiol	Estradot®	No
Estradiol	Climara®	No
Estradiol/norethisterone	Estalis Continuous®	No
Fentanyl	Mylan Fentanyl	No
Fentanyl	Sandoz Fentanyl	No
Oxybutynin	Oxytrol®	No
Rivastigmine	Exelon®	No

Prior to an MRI check:

1. Is the patient wearing a transdermal patch?

2. Is it within the radiofrequency coil?

3. Is it metal containing?

4. If an increase in drug concentration occurs (e.g. due to heat) would the patient be at increased risk of toxicity? Consider the duration of heat exposure, toxicity of drug, other medicines that may have additive adverse effects, and patient characteristics such as frailty.

5. If the patch is removed make sure it is replaced on a new site. A new patch may be required if the original patch does not adhere.

Also see HQSC Medication Alert: Transdermal Patches