

## Pluronic Lecithin Organogel (PLO) Gels: Exploring the Evidence October 2018

Administering medications via off-label routes is common in hospice and palliative care despite lack of published evidence. Patients' ability to swallow diminishes or is lost completely as they approach end of life requiring the need for alternative routes of administration. Some oral medications are administered rectally, but this may not be feasible or desired by all patients or caregivers. A topical route can be used to manage local symptoms such as muscle aches, arthritic pain or certain types of neuropathic pain. The transdermal route is used for systemic effects, however, commercially available products are lacking for most symptoms. The introduction of pluronic lecithin organogel (PLO) to the compounding world promised to improve the systemic absorption of medications through the skin. Over the years, many medications and combinations have been incorporated into PLO gels and prescribed despite the lack of human bioavailability studies.

### What Is a Topical PLO Formulation and How, in Theory, Does it Work?

PLO is a type of topical dosage form that represents a means of administering medications once the oral, rectal or parenteral routes can no longer be utilized or are no longer appropriate.<sup>1,2</sup>

Topical compounds in PLO are composed of the active drug(s) suspended in a vehicle consisting of water and two plant derivatives, pluronic acid and lecithin. In theory, these components work together to temporarily disorganize the outermost layer of the skin to provide maximum absorption of the drug, but without causing skin damage.<sup>3</sup>

Topical compounds in PLO differ from other types of topical creams, gels or ointments in that they *generally* work systemically rather than locally. This means that when applied, medications incorporated in PLO gel should penetrate the skin to allow absorption by the bloodstream. However, these systemic effects are not supported by evidence; most topical PLOs work best when applied directly to the affected area for local symptom control.<sup>4-8</sup>

### Where and How Should a PLO Compound Be Applied?

Although there are no specific guidelines/regulations on how gels should be used, general directions include:

- PLO compounds used for systemic effects should be applied topically to a thin, hairless area of the skin to increase the likelihood of reaching the vasculature. In the majority of patients, the inner wrist or forearm is acceptable.<sup>9,10</sup> Other sites that have been reported anecdotally include behind the knee, inner thigh and the carotid (very light rubbing to avoid carotid massage).
- PLO compounds used for their local effects, such as ketoprofen<sup>4-6</sup> and ketamine,<sup>7,11,12</sup> should be applied directly to the affected area. However, patients with several affected areas or a very large affected area should consider an alternative therapy.

# PALLIATIVE PEARLS

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- Once the gel is placed on the skin, rub in for one full minute until it is completely dissolved. If the gel disappears into the skin before the full minute has passed, add a few drops of water and continue rubbing it into the skin for the remainder of the time. The purpose of the water is to re-emulsify the gel that should help ensure maximal absorption. Another application technique is to run both wrists together after the gel is applied to the skin for 0.5 to 3 minutes until dry.<sup>10,13</sup>

PLO compounds may be very irritating to mucous membranes and to open areas or sores on the skin; therefore they should NOT be applied rectally or vaginally or to open lesions, or taken orally.

### Is There Literature To Support The Safety and Efficacy of PLO Compounds?

Although the active ingredients in compounded gels were reviewed and approved by the Food and Drug Administration (FDA), compounded gels are not FDA reviewed. For most compounds, the **percentage of drug absorbed from the PLO is unknown**. Since PLO compounds in general have questionable absorption, they are **considered last line therapy** when the oral, rectal and parenteral routes are no longer feasible.

Studies supporting the use of PLO gels vary depending on the active ingredients. In general, human clinical trials are limited and most compounds either do not have literature to support their use, or is based in animal models, case reports and anecdotal reports. Overall, the evidence for PLO's is quite weak and/or conflicting.<sup>14</sup> Specifically, there is evidence that ABH,<sup>9,15,16</sup> chlorpromazine,<sup>17,18</sup> quetiapine,<sup>19,20</sup> promethazine,<sup>13</sup> morphine,<sup>21-24</sup> and dexamethasone<sup>25</sup> PLO gels ARE NOT reliably absorbed across the skin (systemically absorbed). This leads to the conclusion that they are likely ineffective when applied topically. Topical drugs, such as topical non-steroidal anti-inflammatory drugs for local arthritis symptoms (e.g., ketoprofen) and topical anesthetics (e.g., ketamine), are thought to be safe and effective.

In particular, the evidence for anti-nausea PLO gels have not been proven effective in any large, well-designed or placebo-controlled trials.<sup>26</sup>

- The active ingredients in ABH are not absorbed to systemic levels that could be effective. Only diphenhydramine (Benadryl®) is absorbed via the skin, and then only after several hours and erratically at sub-therapeutic levels.<sup>16</sup> It is therefore not appropriate for “as needed” use.
- Some believe that use of PLO's produce a placebo effect of symptom relief. Others speculate that the site and method of application are keys to their effects, not the systemic absorption and action of the active medication(s).
- Rubbing the wrists innervates an acupressure point that alleviates nausea and perhaps other symptoms. The PC 6 acupressure point is located in the groove between the two large tendons on the inside of the wrist that start at the base of the palm. Special wristbands that are sold over the counter press on similar pressure points and work for some people.<sup>27-29</sup>

Due to the **lack of evidence supporting**, use of PLO's with intention of systemic absorption may delay or prevent the use of more effective interventions. Careful consideration is imperative prior to initiating.

**For additional information on this topic, please review these references:**

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