Hydromorphone dosing confusion

Reported Incident (details are modified to ensure confidentiality of the home and reporter)

A resident was receiving hydromorphone 2 mg/mL by subcutaneous injection on a palliative basis. Staff contacted the on-call physician to request an increase in the hydromorphone dose to address perceived resident discomfort. The nurse told the physician that the resident had been receiving 1 mL of hydromorphone subcutaneously every 4 hours. The doctor misinterpreted the information as 1 mg subcutaneously every 4 hours and ordered an increase to 2 mg subcutaneously every 4 hours. The nurse interpreted the new dose as 2 mL and verbally confirmed the increase to “2” subcutaneously every 4 hours.

During the nursing second check, another nurse realized that the original dose had been 1 mL, which is equivalent to 2 mg of hydromorphone (given the concentration of 2 mg/mL), and noted that an increase to 2 mL, equivalent to 4 mg of hydromorphone, every 4 hours seemed excessive. Staff contacted the prescriber, and the error was discovered.

Disclaimer: ISMP Canada staff determined the following key contributing factors and considerations for improvement. It is the responsibility of medication safety leaders in long-term care to determine what, if any, actions for improvement are needed in their medication management processes.

Key Contributing Factors:

- Misinterpretation of the dosing units led the prescriber to order a higher dose of hydromorphone than was warranted.
- The nurse verbally confirmed an increase to “2” without specifying the unit of measure, which led the prescriber to acknowledge the “read-back”.
- A second check by another nurse led to the error being caught and corrected before harm could occur.
- Verbal communication regarding medication adjustments.

Considerations for Improvement:

- When communicating medication information, clearly convey the intended units by using the full name of the unit (e.g., milligrams, millilitres).
- Restate the entire order, including units, when confirming or reading back the order, e.g., “increase hydromorphone to 2 milligrams which is equivalent to 1 millilitre subcutaneously every 4 hours.”
- Ensure robust checking procedures for controlled substances and high-alert medications.
- Ensure that all labelling indicates both the strength and the equivalent volume, e.g., “Inject 2 mg (= 1 mL) subcutaneously every 4 hours.”
- Prescriber order entry and bidirectional electronic communication technology.


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