Use of meperidine in patient-controlled analgesia and the development of a normeperidine toxic reaction.

Simopoulos TT, Smith HS, Peeters-Asdourian C, Stevens DS. Arch Surg 2002; 137:84-88.

Prepared by: : Doreen Oneschuk, MD

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Abstract:

Hypothesis: Intravenous patient-controlled analgesia (IV PCA) meperidine hydrochloride can be used with a reasonable margin of safety.
Design: A retrospective review was performed of 355 medical records of patients receiving IV PCA meperidine treatment. Four groups of patients were defined, based on daily meperidine dose and the presence or absence of central nervous system excitation adverse effects. Use of more than 600 mg/d of meperidine hydrochloride was considered a high dose.
Setting: University tertiary care hospital.
Participants: Postoperative patients from general, orthopedic, neurosurgical, gynecological, and urologic procedures receiving IV PCA.
Interventions: If patients were judged to have consumed significant amounts of meperidine, the analgesic regimen was modified to (1) discontinue meperidine therapy, (2) substitute hydromorphone hydrochloride, or (3) decrease the use of meperidine by adding oral methadone hydrochloride or transdermal fentanyl citrate to the regimen.
Main Outcome Measures: Patients who received less than 10 mg/kg per day of IV PCA meperidine hydrochloride therapy were unlikely to experience central nervous system excitatory adverse effects and maintain adequate analgesia.
Results: The mean meperidine hydrochloride consumption for those patients classified as high dose, asymptomatic was 13.3 mg/kg per day (95% confidence interval, 12.2-14.4 mg/kg per day). This differed statistically significantly (P<.05) from the mean meperidine hydrochloride dose in patients classified as high dose, symptomatic, which was 16.9 mg/kg per day (95% confidence interval, 14.7-19.2 mg/kg per day). The duration of meperidine use did not differ among the 4 patient groups. The incidence of a central nervous system toxic reaction associated with IV PCA meperidine therapy was 2%.
Conclusions: We recommend 10 mg/kg per day as a maximum safe meperidine hydrochloride dose by an IV PCA device for no longer than 3 days. Daily patient evaluation is mandatory. Care must also be taken when using this dose to ensure the absence of renal dysfunction or enhanced hepatic metabolism of meperidine.

Comments:

Strengths/uniqueness:
It is encouraging to see attention being given by a surgical journal to pain management and the use of opioids. Provides a brief but useful discussion of meperidine pharmacodynamics and pharmacokinetics.

Weakness:
This study is limited by its retrospective nature and small sample size. Given that the focus is on surgical

patients and short term use of IV PCA, it is not generalizable to chronic cancer pain treatment.

Relevance to Palliative Care:

Provides a reminder of the potential neurotoxicity associated with meperidine use. This study may be useful for designing a prospective study.