DOES MEPERIDINE STILL HAVE A PLACE IN PAIN CONTROL?

The Evaluation of Meperidine Use in Adult Patients in a teaching hospital

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OBJECTIVES

Due to concerns about meperidine drug interactions and its metabolite normeperidine neurotoxicity, Taiwan FDA has issued “Meperidine Guideline” in order to reduce the use of meperidine as a first-line agent for analgesia in September, 2011. The study is designed to reduce meperidine use by means of providing physician education and pharmacist intervention.

METHODS

The study was executed at the Orthopedics Department in a teaching hospital in Taiwan. We included inpatients who received at least one dose of parenteral morphine or meperidine between September and December, 2011. Physician education and pharmacist intervention were provided. The study duration was divided into 3 periods: pre-education, post-education, and pharmacist intervention period. We compared the number of doses ordered between three periods, and assessed the change of pain score and respiration rate in whole period between two opioids.

Figure 1. Flow chart

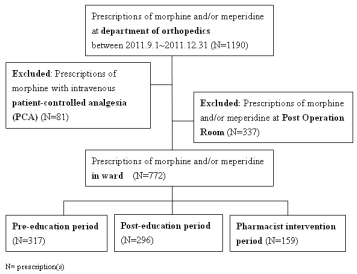


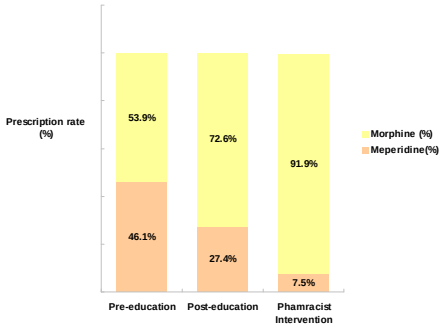
Table 2. Baseline demographic

N= patient number	Meperidine (N=111)	Morphine (N=264)
Gender		
Male(%)	66(59.5%)	102(38.6%)
Female(%)	45(40.5%)	162(61.4%)
Age(y/o)	52±21.8	59.1±18.5
≦65 y/o(%)	78(70.3%)	154(58.3%)
＞65 y/o(%)	33(29.7%)	110(41.7%)
	(N =109)	(N =261)
Clcr(ml/min)	79.7±24.1	76.1±28.5
Clcr＞50 ml/min (%)	92(84.4%)	211(80.8%)
Clcr≦50 ml/min (%)	17(15.6%)	50(19.2%)

Table 3. The indications of morphine and meperidine prescriptions

Indication N= Prescriptions	Meperidine (N=250)	Morphine (N=522)
Moderate /severe pain	243(97.2%)	517(99.0%)
Postoperative shivering	4(1.6%)	2(0.4%)
Anesthesia Adjunct	3(1.2%)	3(0.6%)

Figure 2. The distribution of meperidine and morphine prescriptions during the study period



RESULTS

During the study duration of 4 months, 375 patients were included and total of 772 prescriptions, including 250 prescriptions of meperidine and 522 prescriptions of morphine, were ordered (Figure 1). 111 patients received meperidine and 264 patients received morphine. In the meperidine group, there were more male patients than female patients (59.5% vs. 40.5%); on the other hand, there were more female patients in the morphine group (61.4% vs. 38.6%). The average age for patients receiving meperidine was 52.0 years old and for patients receiving morphine was 59.1 years old. The baseline renal functions for both groups were similar and the percentages of patients who had impaired renal function were similar in both groups (Table 2).

Among total of 772 prescriptions of morphine and meperidine orders, 98.4% of them were for moderate to severe pain, 0.8% of them were for postoperative shivers, and 0.8% of them were ordered as adjunct for anaesthesia (Table 3).

The number of meperidine doses ordered was shown to decline by 18.7% (46.1% to 27.4%) in the post-education period. During the pharmacist intervention period, the number of meperidine doses ordered was decreased by an additional 19.9%.(Figure 2) The changes in pain score and respiratory rate between meperidine and morphine in all periods were statistically equivalent with p-value of 0.73 and 0.70, respectively. (Table 4&Table 5).

CONCLUSION

The changes in pain score and respiratory rate indicate that the effectiveness and respiratory inhibition of two opioids are not significantly different. Given the fact that neurotoxicity is associated with normeperidine, meperidine is not an appropriate first-line narcotic for pain management. Pharmacists have the responsibility to modify the habitual prescription with appropriate rationale. Pharmacists’ active involvement in the collaborative care of patients with pain control has reduced the use of meperidine, and the possible risk of neurotoxicity as well.

Table 4. Pain scores (VAS scale)

Average pain score (N= opioid prescription)	Meperidine (N=216)	Morphine (N=443)	*P value
Before administration	5.4±1.3	5.5±1.2	0.373
After administration	2.2±0.8	2.1±0.7	0.153
Average change in pain score	↓3.1±1.4	↓3.3±1.3	0.728

* Independent T test

Table 5. Respiratory rates

Average Respiratory Rate (RR) (N= opioid prescription)	Meperidine (N=216)	Morphine (N=437)	*P value
Before administration	18.5±1.7	18.5±1.5	0.846
After administration	18.4±1.1	18.2±1.6	0.076
Average RR change (time/min)	↓0.1±1.7	↓0.3±1.1	0.702

* Independent T test