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Association of gabapentin concentrations with opioid use after cesarean delivery

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Abstract

PURPOSE: As part of enhanced recovery after surgery (ERAS) protocols for cesarean delivery (CD), gabapentin is being used as an adjunct to reduce opioid use postoperatively. The objective of this study was to detePaper #1rmine if concentrations of gabapentin in maternal plasma were associated with opioid use in the first 48 hours after cesarean delivery.

METHODS: A pragmatic, observational, IRB-approved study was conducted for patients ≥18yo undergoing CD. The institutional CD ERAS protocol includes scheduled dosing of gabapentin immediately before and for 48 hours postoperatively as an adjunct pain medication. Scheduled acetaminophen and ibuprofen are also used routinely in the postoperative setting. After receiving informed consent, a pharmacokinetic (PK) study was performed, collecting multiple maternal plasma samples during a single 6-hour dosing interval. PK parameters, including area under the concentration time curve (AUC0-48h), were calculated using a population PK (PopPK) approach. Recorded opioid use during the first 48 hours following CD was converted to total morphine milligram equivalents (MME48h) for all subjects using standard conversion. Correlation of gabapentin plasma AUC0-48h with total MME48h was assessed using linear regression and t-tests as appropriate.

RESULTS: 21 participants provided plasma PK samples and MME data. The mean AUC0-48h was 101.1 ± 26.1 mg/L*h (median 96.7, range 60.6 to 174.8 mg/L*h). The mean total MME48h was 123.2 ± 139.8 mg (median 43.6, range 7.50 to 517.0 mg). The individual MME48h totals showed clear variability with 12 (57.1%) being <60 mg (range 7.5 - 54.5 mg) compared to the remaining 9 (42.9%) that were >90 mg (range 92.0 - 517 mg). The association between calculated gabapentin AUC0-48h and total MME48h was not statistically significant (r=0.12, p=0.61). Additionally, total MME48h did not differ if the CD was a primary or repeat procedure (p=0.53). Using the cutoff of low or high total MME48h in our population, gabapentin AUC0-48hs in the highest quartile (>121.06mg/L*h) included 60.0% of participants using high amounts of total MME48h (≥90 mg), compared to 37.5% of those not in the highest AUC0-48h quartile (p=0.375).

CONCLUSIONS: Higher plasma concentrations of gabapentin did not account for the variability in total MME use after CD.