

P-41

The advantage of adding intravenous calcium gluconate to the conventional analgesic treatment in lead-induced abdominal pain

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Objectives: Iranian emergency physicians reported thousands of opium users who present to the emergency departments (EDs) throughout the country with intractable severe abdominal pain which do not respond satisfactorily to any opioid-mimicking substance [1]. We aimed to investigate the effect of intravenous calcium gluconate on opium dependent patients who present to the ED with lead-induced abdominal pain.

Methods: In this single-center double blinded randomized controlled trial, a convenience sample of adult opium addicted patients who presented to an academic ED with abdominal pain and had an initial diagnosis of lead poisoning were included and randomly subjected to two different analgesic treatments under cardiac monitoring and pulse oxymetry: the conventional treatment group (group 1), who were assigned to a starting morphine dose of 0.1 mg / kg and infusion of normal saline with increments according to their daily oral regular opium use, and the intervention group (group 2), who were subjected to infusion of 10 mL intravenous calcium gluconate 10% in addition to the treatment administered to group 1. Participants who had blood lead levels (BLL) <25 µg/dL or had a final diagnosis other than lead-related abdominal pain were subsequently excluded from the study. The visual analogue scale (VAS) score was determined by each patient (0 to 100 mm) before treatment, and 15, 30 and 60 minutes after treatment.

Results: A total of 50 patients (25 in each group) were enrolled. BLL and VAS had no significant baseline differences before any treatment in groups 1 and 2, with mean (SD) values of 59.2 (22.2) vs. 56.6 (16.6) µg/dL for BLL and 67.0(10.3) vs. 69.3 (11.6) mm for VAS, respectively. The mean (SD) values for total administered morphine dose were similar in groups 1 and 2 [7.8 (1.4) and 7.8 (1.4) mg, respectively]. After treatment, the mean (SD) values of VAS dropped to 64.7 (10.4) vs. 67.1(10.9) mm at 15 minutes, 64.6 (10.9) vs. 58.0 (11.2) mm at 30 minutes (p, 0.041), and 63.8 (10.7) vs. 53.6 (10.9) mm at 60 minutes (p, 0.002) in groups 1 and 2, respectively. The difference in pain reduction in all defined time intervals in the intervention group (group 2) was significant, while using morphine solely (in group 1) was effective only at 15 and 30 minutes (p<0.01). No adverse reaction was seen in relation to the use of calcium gluconate.

Conclusion: The metabolism of lead and calcium are known to be correlated [2, 3]. Adding intravenous calcium gluconate to morphine sulfate further decreased the severity of lead-induced abdominal pain due to the ingestion of lead contaminated opium, which persisted for at least an hour- the duration of our assessment. Moreover, using calcium gluconate may reduce the total administered dose of morphine in a period of several hours. Further interventional studies are recommended to see if response to calcium salts in suspected lead-induced abdominal pain could be an indicative of lead toxicity.

References:

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