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155. Features associated with the development of an abnormal chest radiograph in emergency department patients following a suspected opioid overdose

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Background: Respiratory depression is a hallmark of acute opioid overdose. Patients with opioid overdose may present with numerous respiratory complaints including pulmonary edema or aspiration. The primary purpose of this study was to evaluate demographic and clinical features that were associated with abnormal chest radiographs.

Methods: The ToxIC Fentalog study is a prospective study evaluating patients who presented to an emergency department (ED) from one of 11 sites (25 EDs) following a suspected acute opioid overdose. Patients were enrolled from 2021 to 2025. Discarded blood obtained at ED admission was collected for analysis. Samples were analzyed using liquid chromatography quadrupole time-of-flight mass spectroscopy for over 1,200 unique substances and metabolites. A standardized chart review was conducted for all enrolled patients. Data was entered into a REDCap registry and underwent quality assessment. Patients under age 18, prisoners, and those without discarded blood were excluded. The emergency departments were grouped by region (West = California, Oregon, Colorado; Midwest = Missouri, Michigan; East = New York, New Jersey, Georgia, Pennsylvania). Abnormal chest radiographs were classified into one of five categories (see below). The final reading by the radiologist was utilized. Descriptive data were reported with medians (interquartile range). A Pearson's chi square test with Yates continuity correction was utilized for univariate analysis. Positive findings on univariate analysis were then used in a multivariable regression model.

Results: Of the 2,480 cases, chest radiographs were performed in 1546. The median (IQR) age was 41.5 (32-56) years, with an overall range of 18-89 years; 1,132 (73.2%) were male. Chest radiographs were read as abnormal in 641 (41.4%). These abnormalities included volume overload (63), pneumonia/infiltrate (288), atelectasis without effusion (148), other (76), and infiltrate with volume overload (57). Fifty-one percent of patients with CNS depression in the first 4 h of their ED visit had an abnormal radiograph, compared to 33.2% of patients without CNS depression. This corresponded to a relative risk of 1.5 (95% CI 1.37-1.75; $p < 0.001$). Neither geographic region, age, sex, amount of naloxone bolused, nor the total amount of naloxone were associated with the development of abnormal chest radiographs.

Conclusions: Central nervous system depression within the first 4 h in the ED was associated with an abnormal chest radiograph in patients following a suspected acute opioid overdose. Higher doses of naloxone were not associated with increased odds of developing pulmonary edema on a chest radiograph. Additionally, the total dose of naloxone was not associated with developing an abnormal chest radiograph.