Clinical dashboard development for opioid-related adverse drug events in surgical patients using a national administrative claims database

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Introduction

National attention to opioid-related adverse drug events (ORADES) is growing as efforts to combat the opioid crisis intensify. ORADES include a wide range of complications, from respiratory depression and arrest to opioid induced ileus and urinary retention; previous studies estimate ORADES rates ranging between 10-35% in surgery patients who received opioids [1-3]. ORADES correlate to morbidity, mortality, increased length of hospital stay (LOS) and increased hospitalization costs. We created an innovative dashboard using the Centers for Medicare and Medicaid Services (CMS) administrative claims database. This dashboard can help hospitals utilize ORADES data to facilitate widespread quality improvement efforts.

Materials and methods

This study was reviewed and deemed exempt by the Brigham and Women’s Hospital Institutional Review board. We utilized data from Centers for Medicare and Medicaid Services (CMS) administrative claims database, which contains data from all hospitals in the United States caring for Medicare patients. Claim data includes key fields such as Hospital NPI, ICD codes, present on admission indicator flags, admission and discharge dates, and MS DRG classifications. This dataset represents 30-35% of all hospital discharges. In addition, a literature search was conducted to collect previously published ORADES-defining ICD-9 codes and convert them to ICD-10 codes. Common surgical procedures were captured and defined using diagnostic relate groups (DRG) codes. An in-depth data analysis was performed using detailed claims data, ICD codes in the literate, and the surgical procedure groups to show ORADES quality outcomes by hospital.

Results/Case report

We developed a dashboard that could present meaningful data on ORADES to frontline clinicians and hospital leadership on key quality outcomes such as LOS and complication rates. The dashboard allows hospitals to compare local data on ORADES rates to other hospitals both regionally and nationally. Figure 1 shows a sample hospital with their ORADE incidence rate compared to national rates, and the difference in LOS for cohorts with and without an ORADE. Users are able to refine their search by surgery type (e.g. colorectal, thoracic and spine surgery) by filtering based on diagnostic related groups (DRG) codes. Users were able to filter the ORADES by the primary organ system affected (e.g. respiratory, gastrointestinal, neurologic). Figure 2 shows an example of a screenshot of the historical monthly ORADES rates (in red) and average length of stay for patients with ORADES (in blue) vs patients without ORADES (in green). Detailed data tables for each hospital (Figure 3) are also available to view and download for offline analysis.

Discussion

We created an innovative interface using national administrative claims data that allow hospitals to leverage their ORADES data in order to promote more widespread quality improvement efforts as well as benchmark against national trends. To our knowledge, this is the first dashboard to report ORADE rates and its impact on quality outcomes at the hospital level. This tool and methodology for estimating ORADES rates can be applied to patient safety and quality improvement efforts as a clinically meaningful measure to help monitor and reduce opioid related complications following inpatient surgery, and also be used for research investigations and patient risk stratification.

References


**Tables/images**

**Figure 1**: Snapshot of the Dashboard.

**Figure 2**: Example of a screen shot of the historical rolling 12 months ORADES rates (in red) and average length of stay for patients with ORADES (in blue) vs patients without ORADES (in green).
Figure 3: Example of a screenshot of a data table of a Hospital showing detailed metrics by procedure group & DRG.

**Disclosures**

I declare that there are no conflicts of interest or support that may cause bias in my presentation.