

Impact of Patient Throughput in CT Suite on Iodinated Contrast Media (ICM) Waste Using Multidose Injectors

Niloufar Rafiei Alavi, MD; Julie Limfueco, MHA, RN; Randall Yamamoto, MHA, RT R, CT, CRA; Roozbeh Houshyar, MD; Vahid Yaghmai, MD
University of California, Irvine

Background

- Multidose injectors effectively reduce Iodinated Contrast Media (ICM) waste
- Unlike single-dose, they need ICM disposal and reload every 8 hours, making patient throughput a critical variable
- Our study examines the impact of patient volume on ICM waste savings in multidose injectors



Results

- New simulated patient throughputs (patient/hour) were: 0.8[0.5-0.9], 1[1.2-1.5], 1.8[1.7-1.9], 3.5[3.2-3.9], 4.8 [4-5.5] which were categorized as: <1, 1-1.5, 1.5-2, 2-3, 3-4, and >4 patients/hour
- Total ICM use and waste were significantly reduced in settings with more than 2 patients per hour (2-3: (22.3%), 3-4: (52.7%), >4: 42.5%)
- Conversely, in lower patient volumes, less than 2 patients per hour, the ICM use was significantly higher in multidose injectors (<1: (250%), 1-1.5: (81.6%), 1.5-2: (15.8%) due to residual unused contrast

Conclusion

- ✓ In medical settings with a high number of patients, using multidose injectors for administering contrast material can significantly reduce waste and enhance the efficiency of Iodinated Contrast Material (ICM) usage
- ✓ Conversely, in settings with fewer patients, the benefits in reducing waste and improving ICM usage efficiency are less pronounced when using these injectors
- ✓ The decision to use multidose injectors should be informed by the patient volume of the clinical setting to maximize cost-effectiveness and environmental benefits

Methods

- We retrospectively collected per-patient contrast usage in CT scans at our emergency department for one year
- The amount of contrast waste was calculated for single-dose injectors when 100 mL bottles of contrast were available
- For the same patients, ICM waste with a 1,000 mL syringeless, multidose injector operable for 8 hours was calculated using a simulation model
- To investigate the effect of patient throughput, the model was further modified to generate new datasets with lower and higher patient volumes using a baseline average ED CT patient volume of 2.5 per hour. ICM use and waste were calculated for the 1,000 mL multidose injector for each of these patient volumes

Total ICM Use in Single and Multidose contrast injectors at Different Patient Volumes

