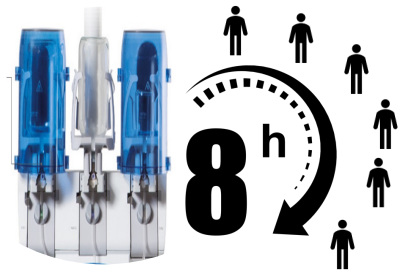


Optimal Iodinated Contrast Media (ICM) Container Sizing for Multidose Injectors at different patient volumes

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Background

- Multidose injectors reduce ICM waste in high-traffic emergency departments
- Conversely, in environments with lower patient volumes, these devices may paradoxically increase waste
- Tailoring container sizes to patient flow might optimize ICM use
- This study aims to explore the relationship between contrast waste and container size in multidose syringeless injectors across various patient volumes



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
- We then defined new bottle sizes for the multidose injectors (500 mL, 2000 mL, and 3000 mL) in addition to the original 1000 mL container size
- To find the optimal container size for each patient throughput, the model was further modified to generate new datasets with lower and higher patient volumes considering the average baseline throughput to be = 2.5 patients/hour
- ICM use and waste were calculated for each container size for different patient volumes

Conclusion

- ✓ Medical facilities should choose ICM container sizes based on their specific patient flow to achieve optimal efficiency and waste reduction
- ✓ In departments experiencing lower patient throughput, smaller 500 mL containers demonstrate superior efficiency in minimizing ICM waste with multidose injectors
- ✓ In high-volume CT suites where patient throughput is much higher, larger ICM containers (such as 2,000 mL and 3,000 mL) are more suitable

Results

- Six patient volume categories in the CT suite were evaluated: <1, 1-1.5, 1.5-2, 2-3, 3-4, and >4 patients/hour
- For the original 1000 ml container, Total ICM waste was significantly reduced in settings with more than 2 patients per hour (2-3: (22.3%), 3-4: (52.7%), >4: 42.5%). Conversely, with less than 2.5 patients per hour, the ICM waste was significantly higher: <1: (250%), 1-1.5: (81.6%), 1.5-2: (15.8%)
- Smaller container size (=500 ml), lead to more contrast saving across all patient volumes 1-1.5: (15.1%), 1.5-2: (29%), 2-3(38.6%), 3-4 (25.1%), and >4 (30%) except for very low patient volumes (<1) which resulted in 19.85% more waste
- Contrast containers larger than 2,000 ml reduce waste only with high throughput: 3-4 (34.1%), >4 (61.8%). For containers larger than 3,000 mL, contrast saving was seen only when >4 patient/hour

