

# Contrast Shortage in Interventional Radiology: A Single Center Review of Changes in Practice Patterns and Radiation Quality Using Alternative Contrast Protocols

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## Background

In early 2022, there was a global shortage of iodinated contrast medium Iohexol (Omnipaque; GE Healthcare), which is the dominant supplier of iodinated contrast media (ICM) in the United States [1]. A few consensus papers and guidelines have been published in response to this supply shortage. It has been shown that diagnostic radiology departments can reduce contrast media consumption by greater than 50%, however there has been less information pertaining to interventional radiology [2]. The purpose of this study is to assess the protocols initiated in Interventional Radiology (IR) during the extreme contrast shortage and study the effects of the protocols on contrast volume reduction, radiation doses, procedure times, and image quality.



## Materials and Methods

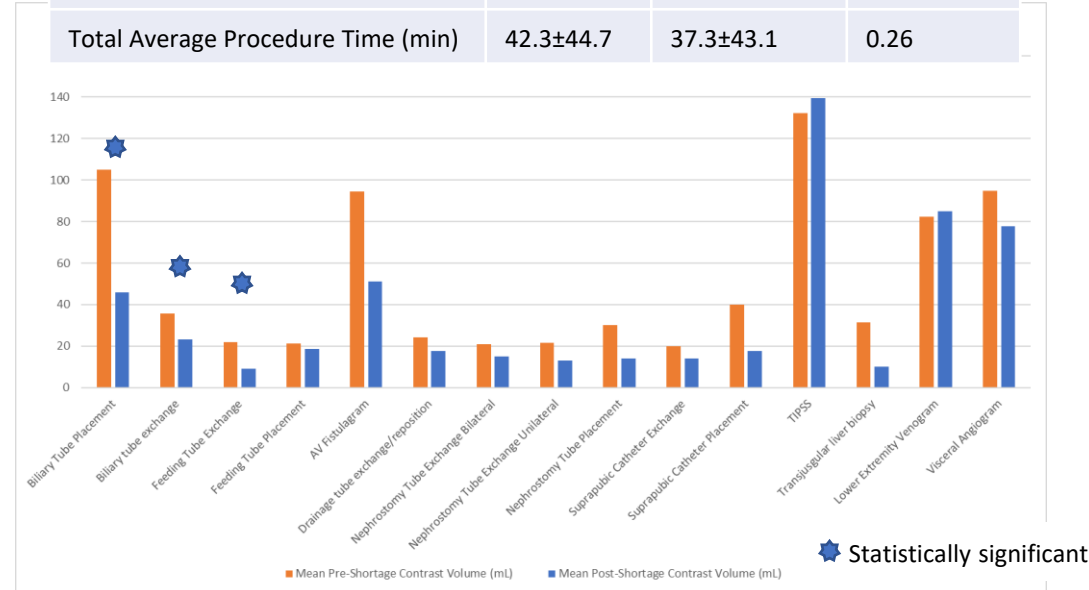
Following IRB approval, a retrospective review was performed of all procedures in Interventional Radiology during a 4-week period before and after the contrast shortage protocol. The contrast shortage protocol included reduction of power injections, increased use of alternative contrast media agents, and preference to alternative imaging modalities such as CT or ultrasound.

Variables such as contrast amount used, procedure time, fluoroscopic time, and radiation dose were compared. Images from the procedure were deidentified on Picture Archiving and Communication Systems (PACS) and blind reviewed by 3 board certified Interventional Radiologists for diagnostic quality (1-5 years experience).

## References:

- [1] Allen, Laveil M et al. "Rapid Response to the Acute Iodinated Contrast Shortage During the COVID-19 Pandemic: Single-Institution Experience." *Journal of the American College of Radiology* : JACR vol. 19,7 (2022): 836-840. doi:10.1016/j.jacr.2022.05.005
- [2] Amukotuwa, Shalini A et al. "Impact of iodinated contrast media conserving interventions and lessons for the future." *Journal of medical imaging and radiation oncology* vol. 67,1 (2023): 28-36. doi:10.1111/1754-9485.13458

	Pre shortage mean ± standard deviation	Post shortage mean ± standard deviation	P value
Mean Contrast volume (mL)	39.6±46	29.4±40.9	0.026 
Mean Fluoroscopic Time (min)	8.9±12.9	7.32±10.5	0.21 
Mean Fluoroscopic dose (mGy)	301±610	190±375	0.031
Total Average Procedure Time (min)	42.3±44.7	37.3±43.1	0.26



## Conclusions

- Implementation of contrast shortage protocols can significantly reduce the volume of iodinated contrast media administered, and radiation dose used during interventional radiology procedures.
- Specific exams, such as nonvascular procedures and routine exchanges, demonstrated the largest decrease in contrast usage
- There is no significant change in image quality when implementing a contrast shortage protocol

## Results

- 398 procedures were performed during the study period
  - 196 pre-contrast shortage
  - 202 post-contrast shortage protocol
- 5 procedures (2.5%) were performed with noniodinated contrast media in the pre-contrast shortage protocol period compared to 53 (26%) after implementation.
- For all fluoroscopic procedures
  - The average contrast volume used was reduced from 39.6 mL to 29.6 mL (p= 0.02)
  - The average radiation dose was significantly decreased (208.55 vs 127.37 mGy, p = 0.03).
  - No significant difference was noted in reduction of fluoroscopy time or procedure time
- Contrast volume was reduced the most for:
  - Biliary tube placement (minus 65 mL, p = 0.02),
  - Biliary tube exchanges (minus 12.8 mL, p = 0.04),
  - Feeding tube exchanges (minus 12.7 mL, p = 0.001)
- For visceral angiograms, no significant change was noted for the contrast amount, radiation dose, fluoroscopic time, or procedure time.
- During the blind imaging review, there was no statistical change in the amount of nondiagnostic images produced during the contrast shortage protocol period (p = 0.28).