



BACKGROUND

- GE Healthcare announced iohexol (Omnipaque) supply limitations due to **COVID-19** related lockdown in China, affecting their primary manufacturing facility
- Other iodinated contrast producers **unable to meet global demand**, resulting in ongoing reduced availability of iodinated contrast
- Hospital systems prioritizing medical urgency for imaging, affecting urology practice and leading to exploration of alternative contrast agents and techniques
- We sought to standardize these agents by a **quantitative comparison using a phantom model.**

METHODS

- **Phantom Model & Contrast Agents:** Donut-shaped gel phantom with 10-mm wide plastic rods filled with Omnipaque-300, Omnipaque-350, Visipaque-270, Isovue-370, Gadavist, Eovist, and liquid water; imaged using mobile fluoroscopy.
- **Imaging Acquisitions:** Employed various tube voltages (kVp), tube currents (mA), dose modes, frame rates, and magnification modes to assess image quality for different contrast agents.
- **Quantitative Evaluation:** Extracted regions of interest (ROIs) from each contrast rod to gather mean pixel values and standard deviations; calculated contrast-to-noise ratio (CNR) as the metric for image quality evaluation.
- **Cost Comparison:** Agents were compared according to their price per mL according to their WAC listing.
- **Tissue Modeling:** Experiments were repeated using a 4" thick Gel Pad overlaid atop phantom model

RESULTS

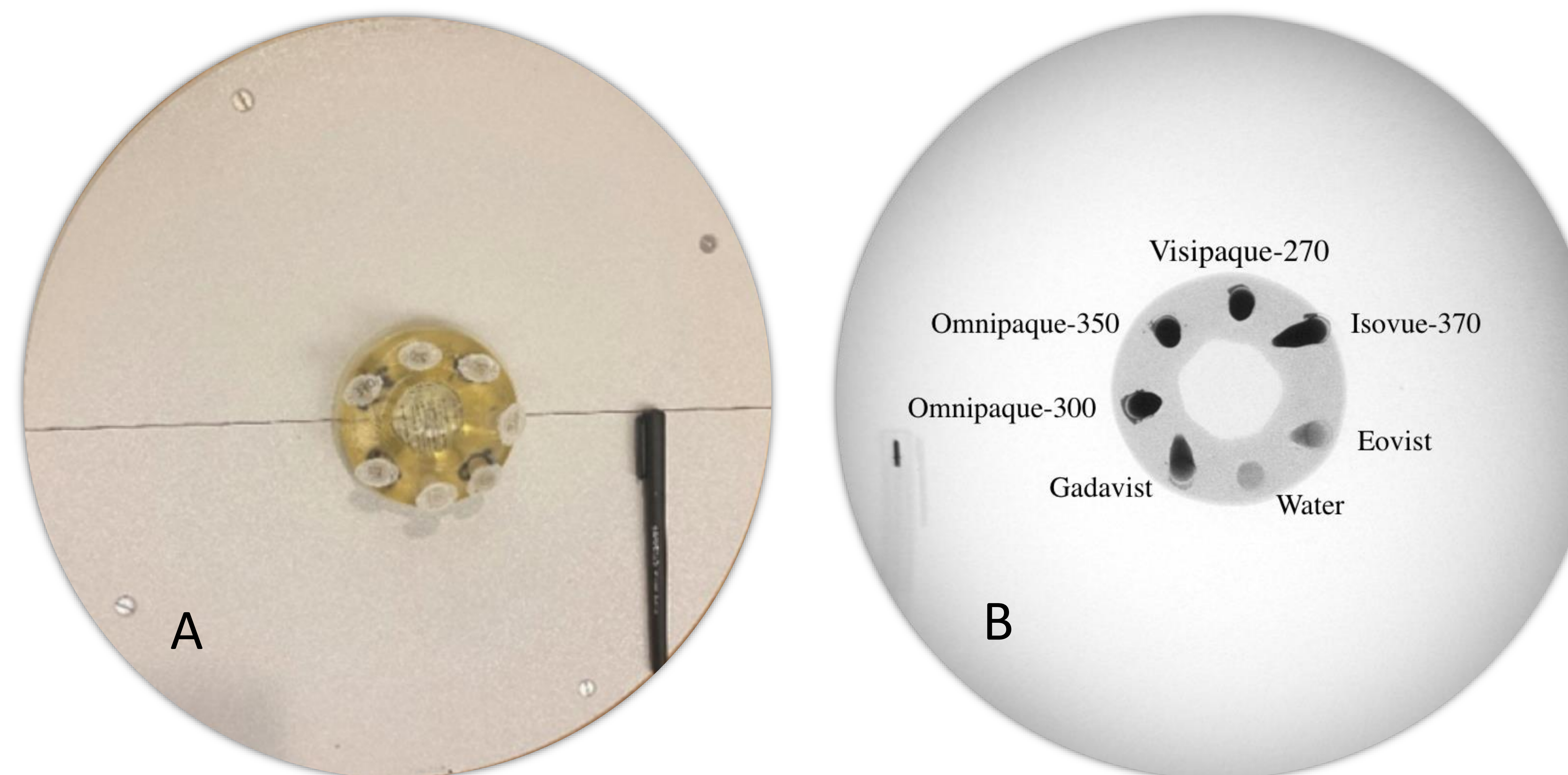


Figure 1: Phantom model construction (A) for contrast comparison with fluoroscopic depiction (B).

Table 1: Contrast agents quantitative comparison* for evaluation of image quality.

Contrast Agent	Concentration	CNR
Iodine-Omnipaque	300	-7.83
Iodine-Omnipaque	350	-7.77
Iodine- Visipaque	270	-7.84
Iodine-Isovue	370	-7.84
Gadolinium-Gadovist	1	-7.42
Gadolinium-Eovist	0.25	-4.88
Water	0	-2.17
Background	0	0

*Controlled for tube current, tube voltage, exposure time, frame rate, dose mode and magnification.

Table 2: Cost Comparison

Contrast Agent	Price per mL
Omnipaque-300	\$ 0.74
Omnipaque-350	\$ 0.75
Visipaque-270	\$ 0.77
Isovue-370	\$ 0.46
Gadavist	\$ 2.81
Eovist	\$ 13.10

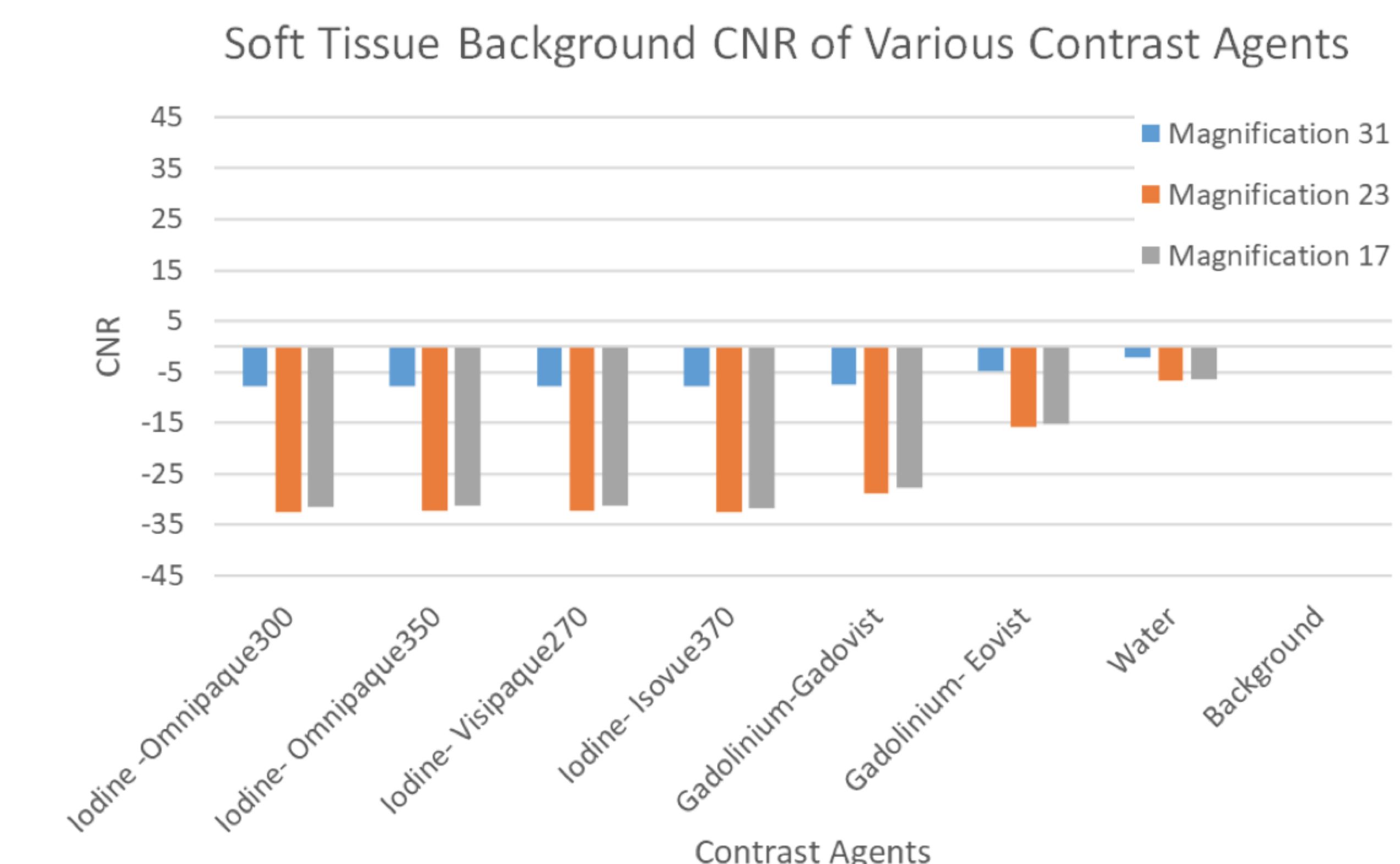


Figure 2: Contrast comparison with soft tissue/fat modeling.

DISCUSSION

- **No difference** in visibility among all agents (except Eovist) across dose modes, frame rates, and magnification
- **Eovist** pixel/CNR values were close to liquid water, indicating reduced visibility
- Increased magnification modes resulted in higher mean pixel and CNR values
- Isovue-370: best image quality for price
- Fat modeling did not affect results

CONCLUSION

- **Most iodinated & gadolinium contrast agents can be used interchangeably without compromising visibility or image quality.**

REFERENCES

1. Lardieri, G., Kennady, E. H., Yeaman, C., & Schenkman, N. (2022). International Iohexol Shortage: Alternative Contrast Agents and Imaging Procedures for the Urologist. *Urology Practice*, 10-1097.