

Bolus technique for contrast echocardiography without saline flush

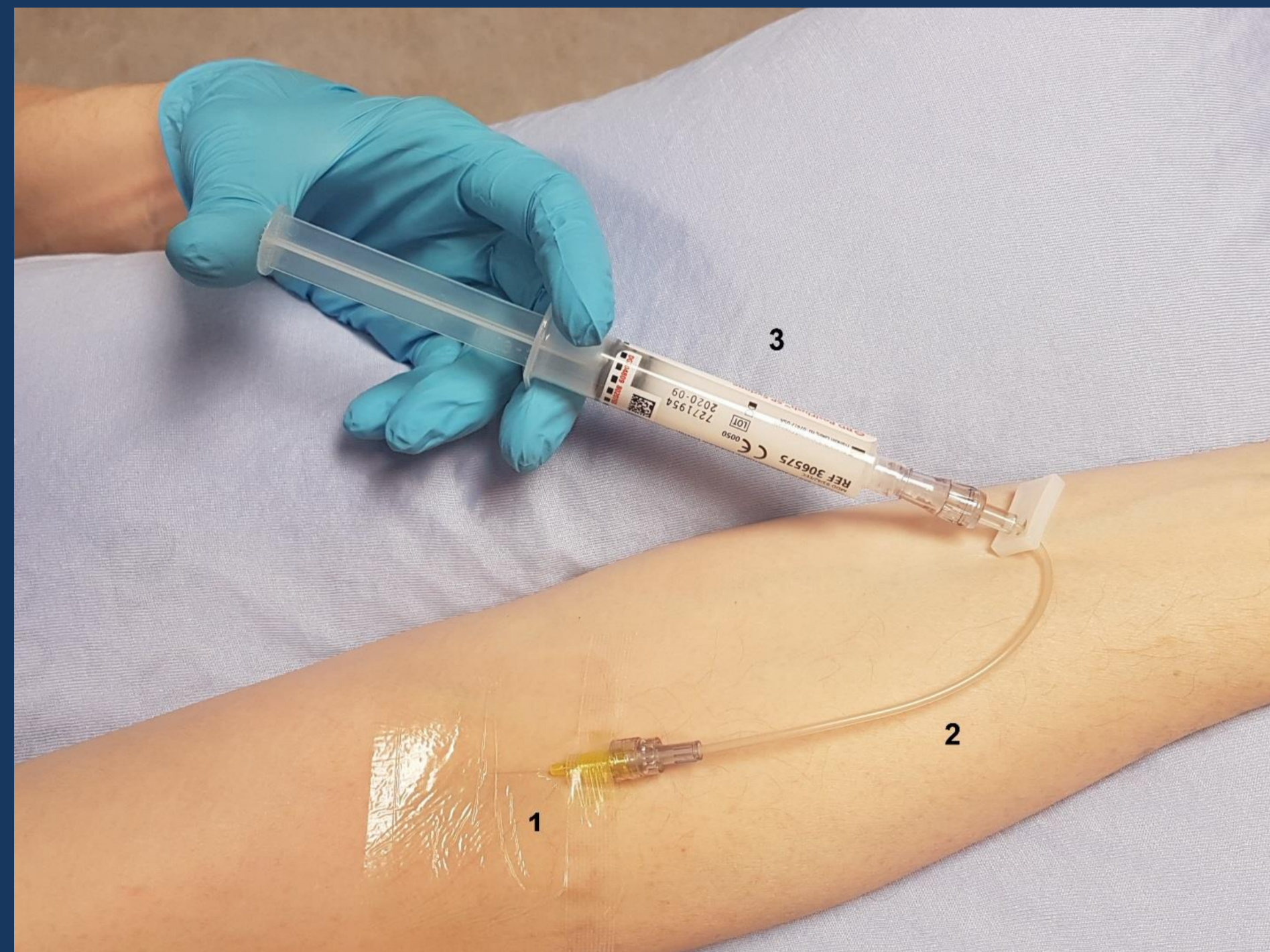
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BACKGROUND

The recommended method of administration of contrast agents is via infusion or bolus administration followed by a saline flush. The injection of a saline flush after every bolus injection of the contrast agent appears to be unnecessary when the contrast agent has been diluted. When only bolus injections of diluted contrast agents are performed, a 'closed' injection system can be used which simplifies the administration of contrast agents and allows a sonographer to more easily perform the injection and scan at the same time.

OBJECTIVE

The objective is to present the experience of a high volume centre with respect to this approach.

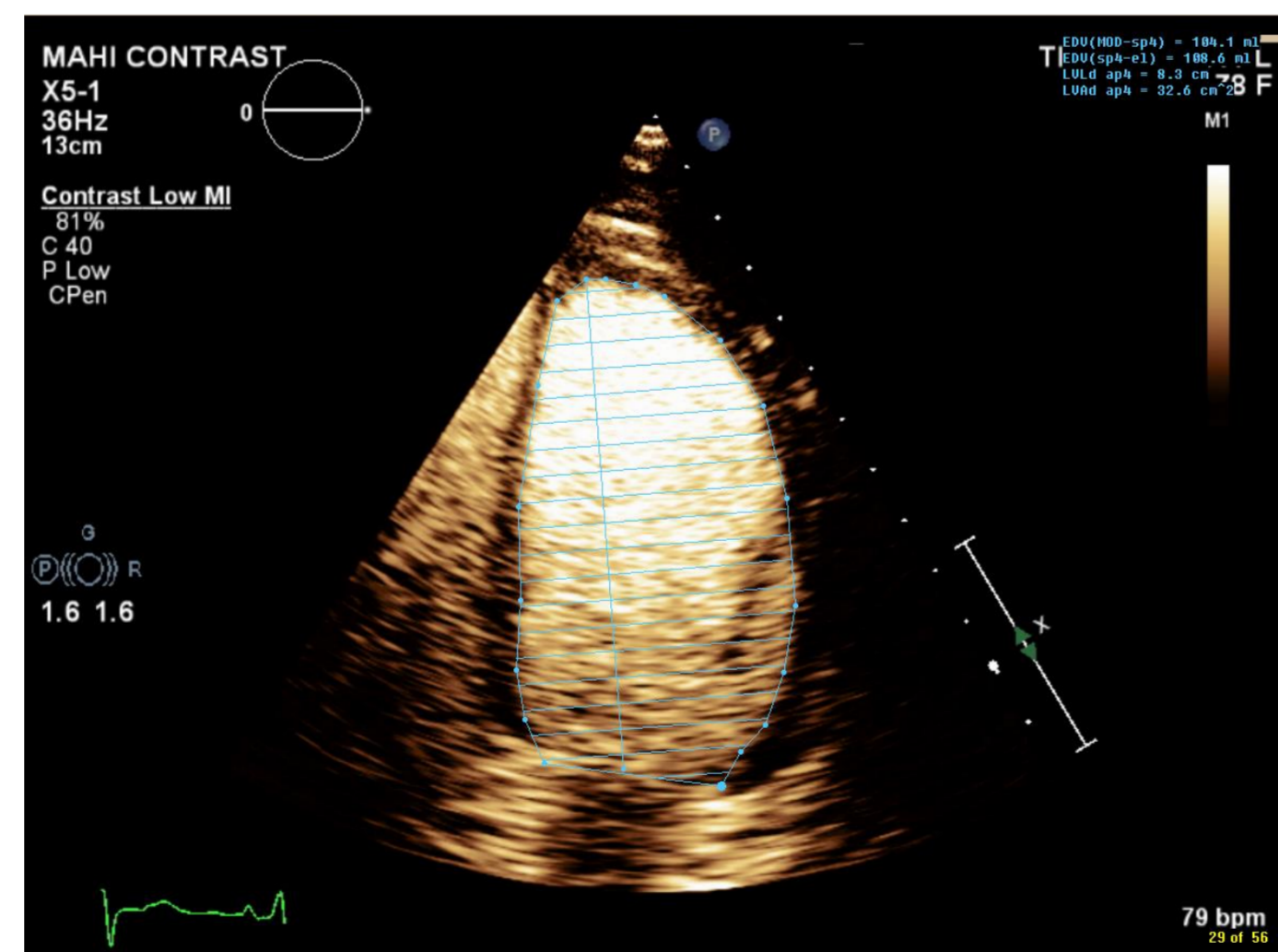


METHODS

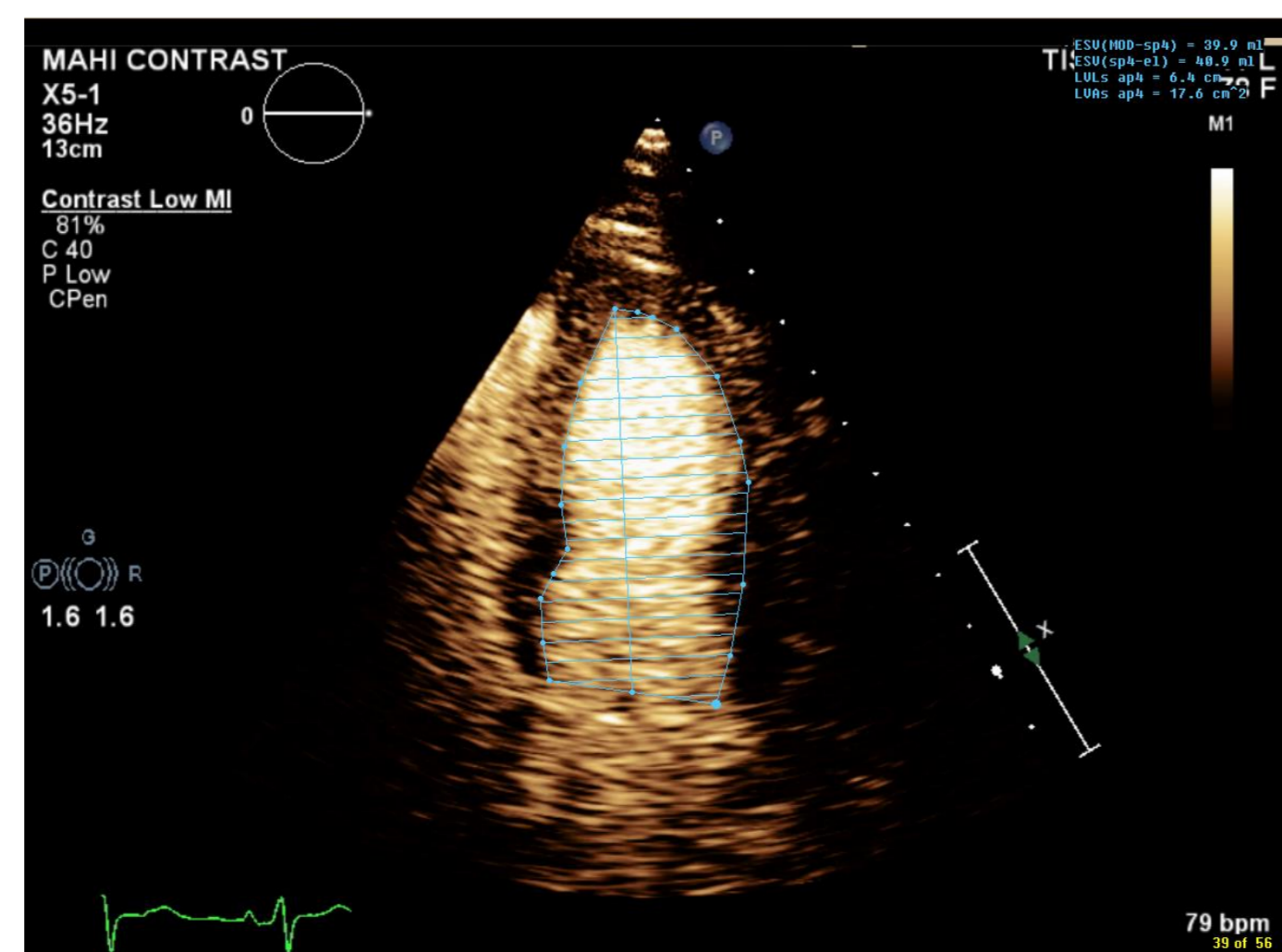
Consecutive patients referred for contrast echocardiography for the monitoring of cardiotoxic effects of chemotherapy were included. The left ventricular ejection fraction was measured using the Simpson's biplane method. All echocardiograms and contrast injections were performed by one experienced sonographer. A closed system was used (Figure 1) consisting of:

- (1) 24 or 22 gauge intravenous catheter
- (2) 18 cm small bore extension set (approximately 0.24 mL) with a microclave, clamp and rotating luer
- (3) 10 mL syringe of 5% solution of perflutren injectable suspension (0.5 mL perflutren injectable suspension in 9.5 mL saline).

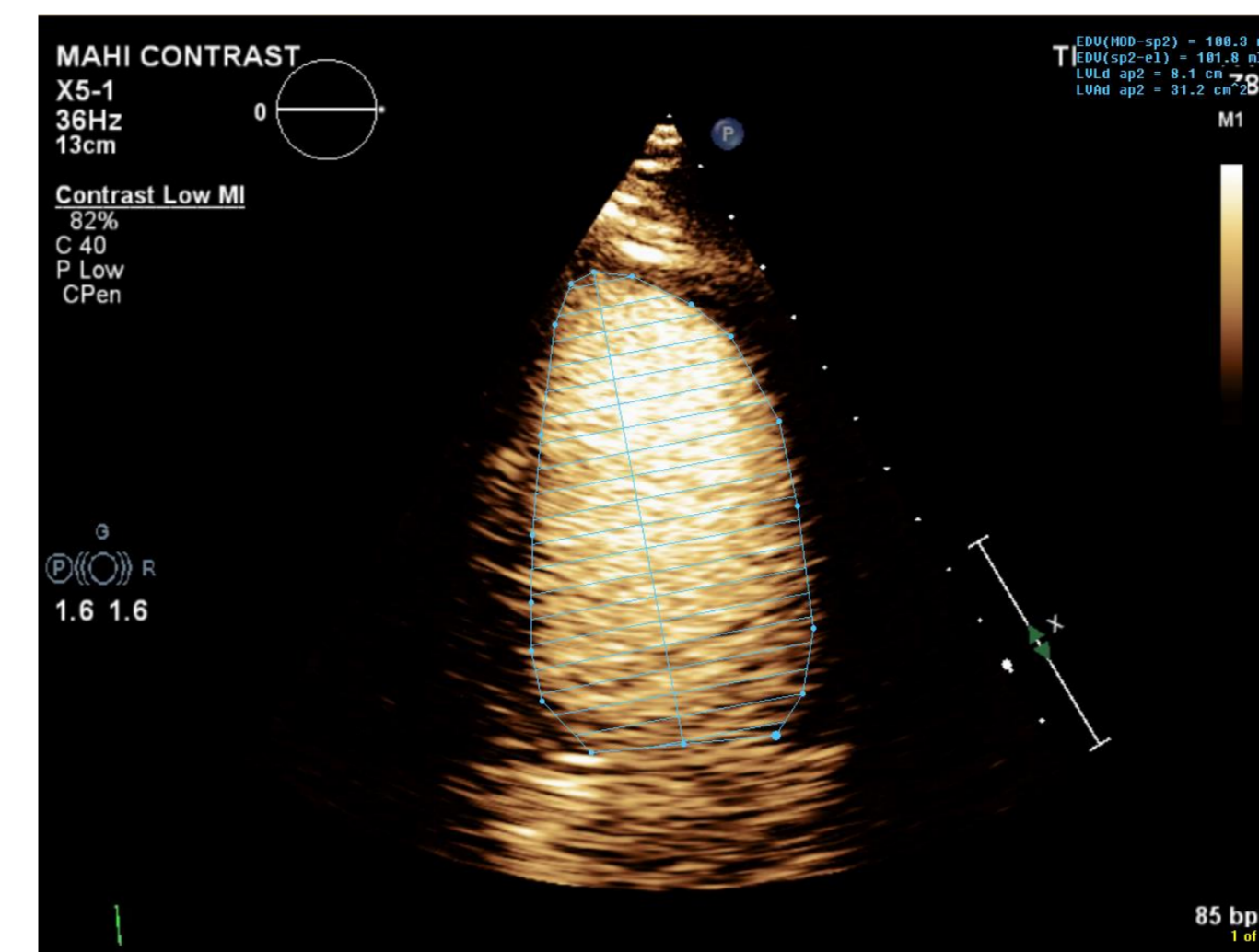
This represents a closed system which allows multiple 0.5 mL or less bolus injections of diluted perflutren injectable suspension. On completion of echocardiogram, the system is removed from the patient without flushing. This technique is mainly used for outpatients but can also be used for inpatients. In the case of inpatients, the intravenous (IV) line is only flushed when all echocardiographic recordings are completed to remove contrast from the IV line prior to the patient returning to the unit.



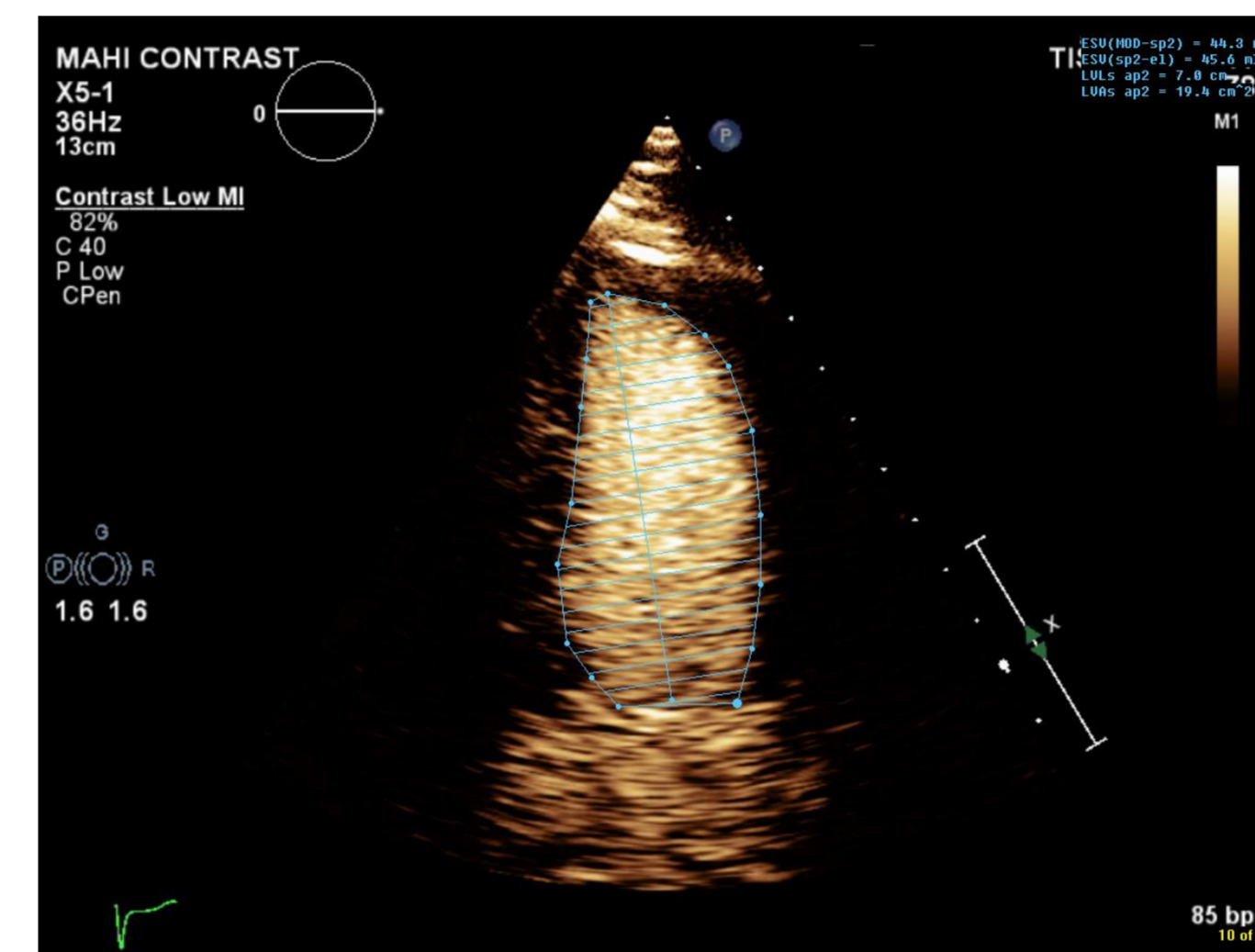
A4 end diastole
104 mL



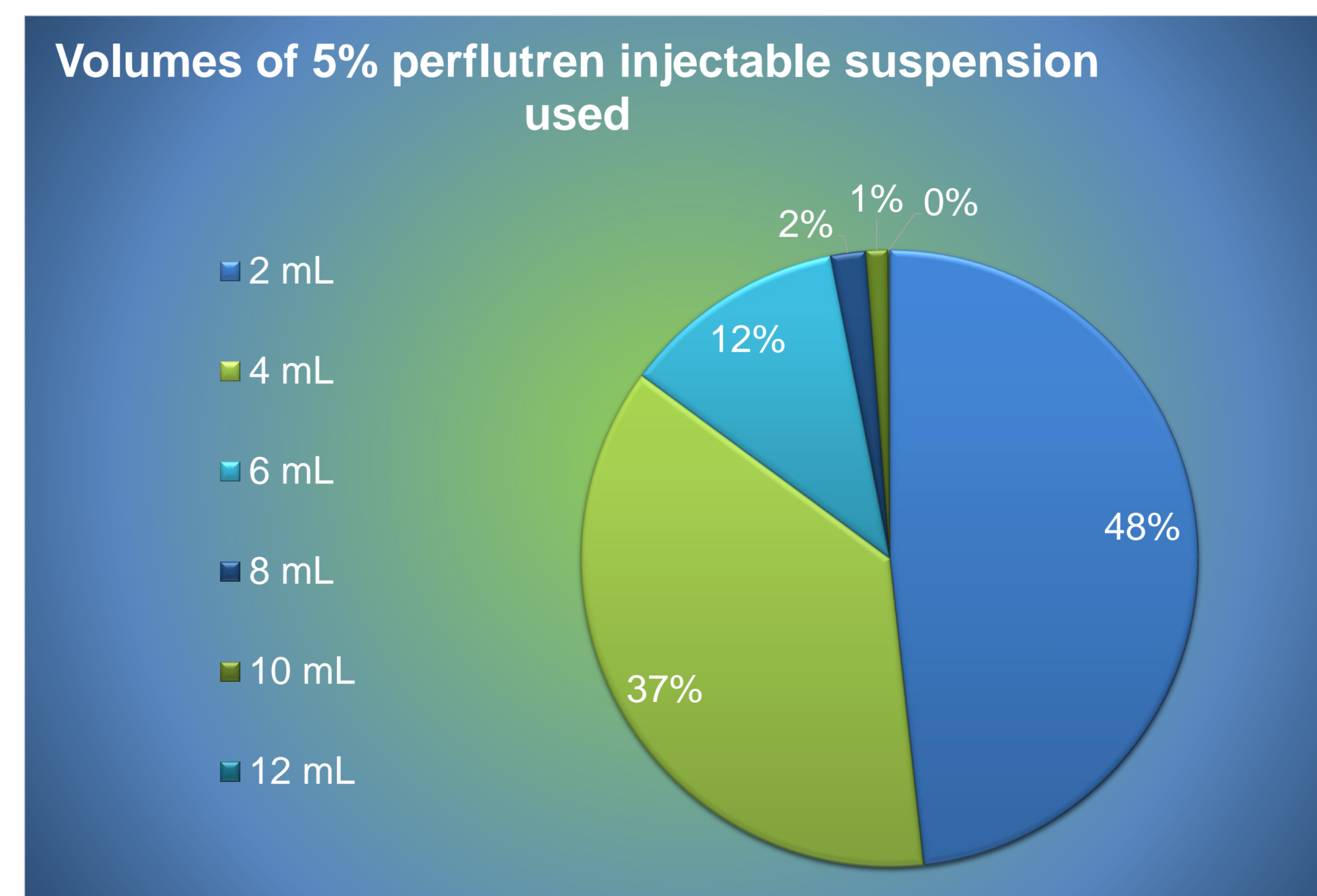
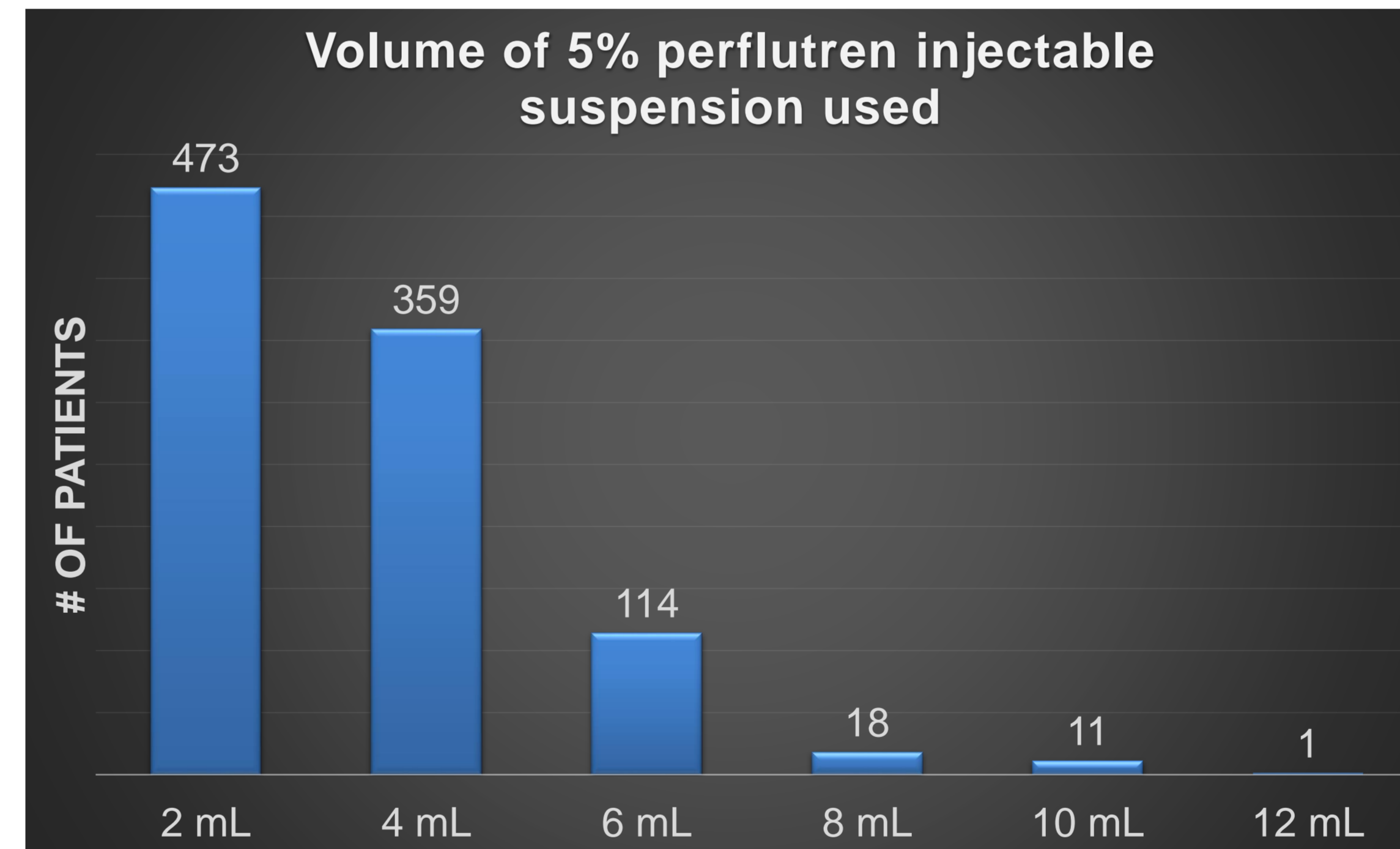
A4 end systole
40 mL



A2 end diastole
100 mL



A2 end systole
44 mL



RESULTS

Between 2016 and 2018, 976 patients received contrast during their echocardiograms. Volumes of 5% solution of perflutren injectable suspension used were as follows: 2 mL used in 473 patients (48%), 4 mL in 359 (37%), 6 mL in 114 (12%), 8 mL in 18 (2%), 10 mL in 11 (1%) and 12 mL in 1 (0%). With the exception of one patient, all echocardiograms were completed with one 10 mL syringe of 5% solution of perflutren injectable suspension.

All echocardiograms were deemed diagnostic for quantitative assessment by the sonographer.

No additional injections were requested by the reading cardiologist.

Only one patient experienced minor back pain. Contrast administration was stopped immediately and the pain resolved within 10 minutes without treatment.

CONCLUSIONS

The closed system for bolus administration of contrast agents without a saline flush has been shown to be effective in a high volume echocardiographic centre.

It facilitates sonographer administered contrast agents without compromising quality.

AUTHOR DISCLOSURES

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No disclosures for other authors