

Utilisation of Bubble Contrast Echo Studies in NHS Lothian

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Patent foramen ovale (PFO) is a tunnel-like passage in the interatrial septum (IAS) affecting approximately a quarter of the adult population.

A PFO can enable paradoxical embolus to transit from the venous to arterial circulation, which is associated with stroke and systemic embolisation.

Bubble contrast echoes are an important investigation which is performed to identify whether a PFO is present by injecting agitated saline via a cannula while performing an echocardiogram to visualise if bubbles cross the IAS and appear in the left heart, signifying the presence of a PFO.

Bubble studies are typically performed on four cohorts of patients; those under 60 being treated for cryptogenic stroke, those with suspected hepatopulmonary syndrome, unexplained decompression illness or orthodeoxia

Introduction

A retrospective audit was carried out on The objective of this audit was to collect and Bubble Contrast Studies performed in the compare data on bubble contrast studies ECG department in the Royal Infirmary of performed in RIE over a four year period to Edinburgh between May 2021-April 2022. determine how the need for the service has The collected data from this period was then increased and the effects this has had on compared with data from the previous four the department in terms of waiting lists, year period (May 2017-April 2021). The audit staffing and ultimately the treatment provided an insight into how much the need outcomes for the patients. for the service has increased and the impact this has had on both the patient outcome and the effect this has had on the echo service as a whole

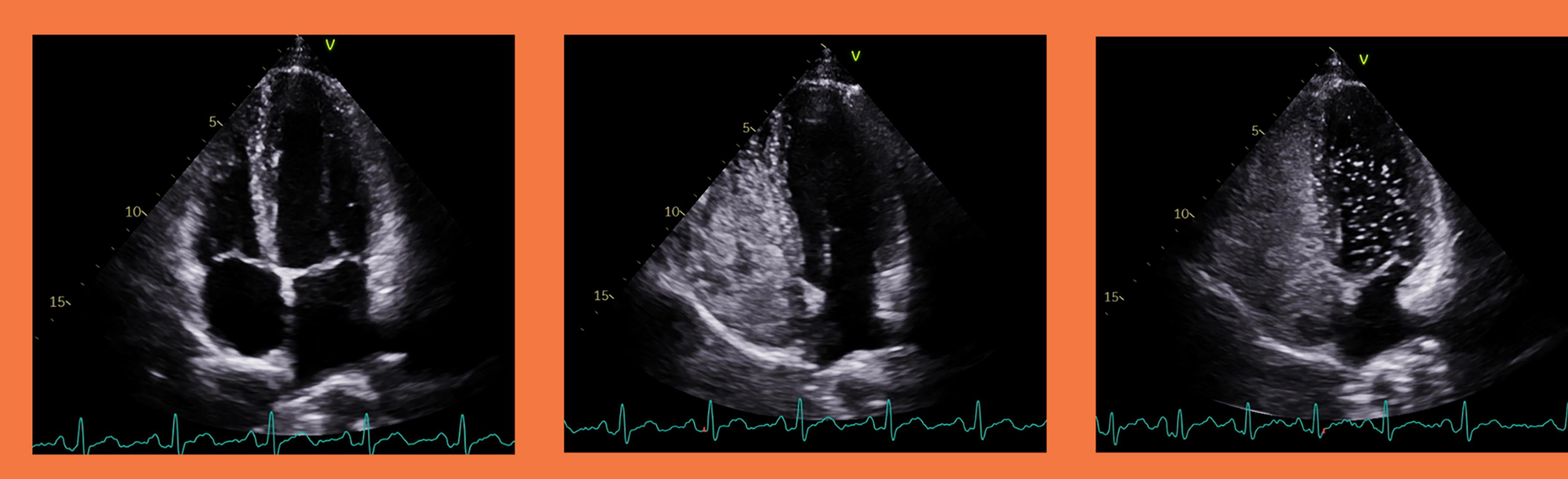
Objective

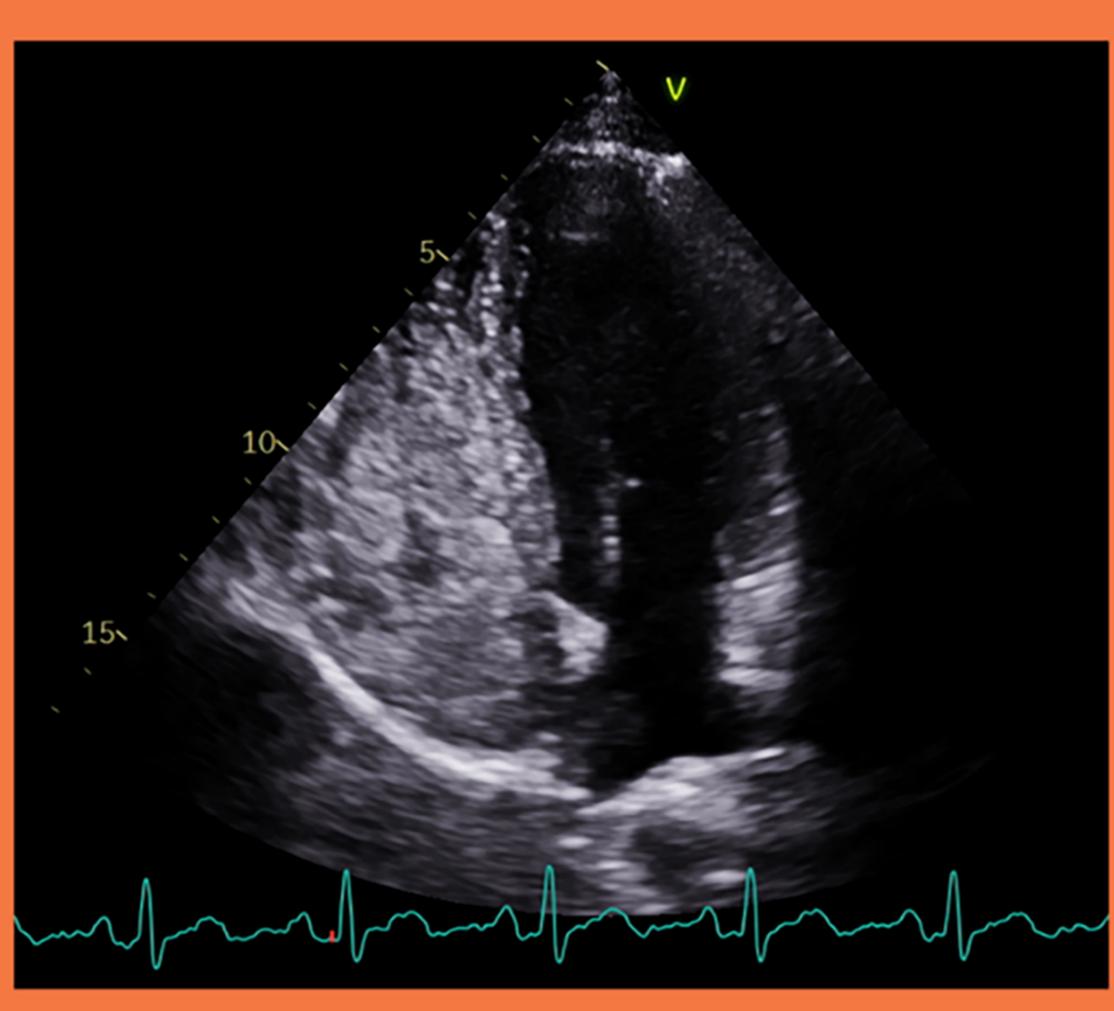
Methodology

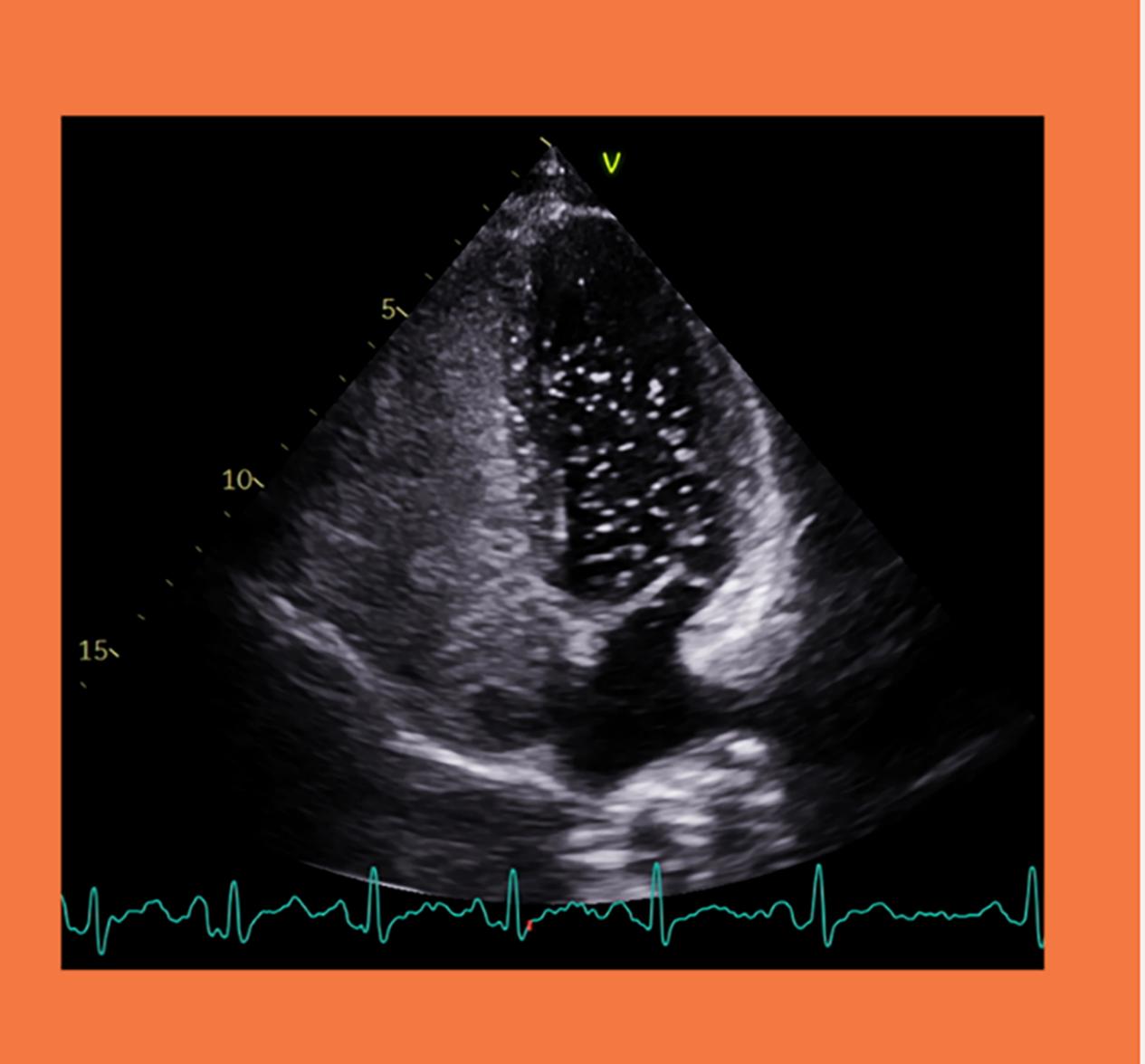
Patient data and results system TRAK and the echo system were used collaboratively to collect data on all patients who had a bubble contrast study performed between May 2017-April 2022.

A variety of data within each study was collected and compared including:

- Requesting speciality
- Referral Reason
- Positive/Negative study
- Number of bubbles in left heart
- ?Aneurysmal interatrial septum
- Size of the shunt
- ?Valsalva performed
- Probability of pulmonary HTN
- Treatment outcome







Results/Findings

The collected data showed:

- 436% increase in the total number of bubble echoes requested
- 35% of the tests were positive showing a PFO
- 52% were negative
- 7% DNA rate

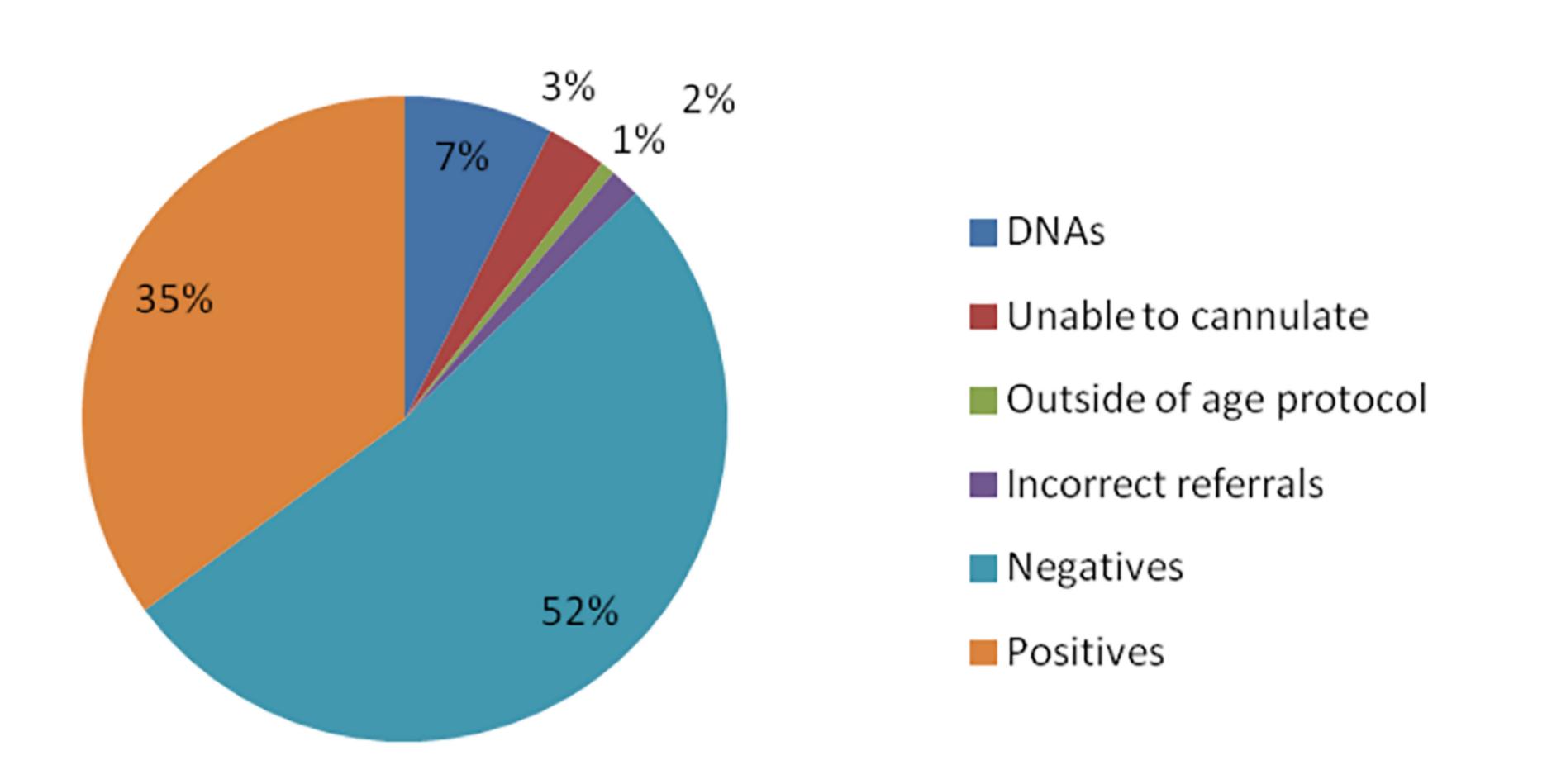
From the positive studies:

- 81% demonstrated a large shunt
- 11% demonstrated a pulmonary shunt
- 8% showed a moderate sized shunt

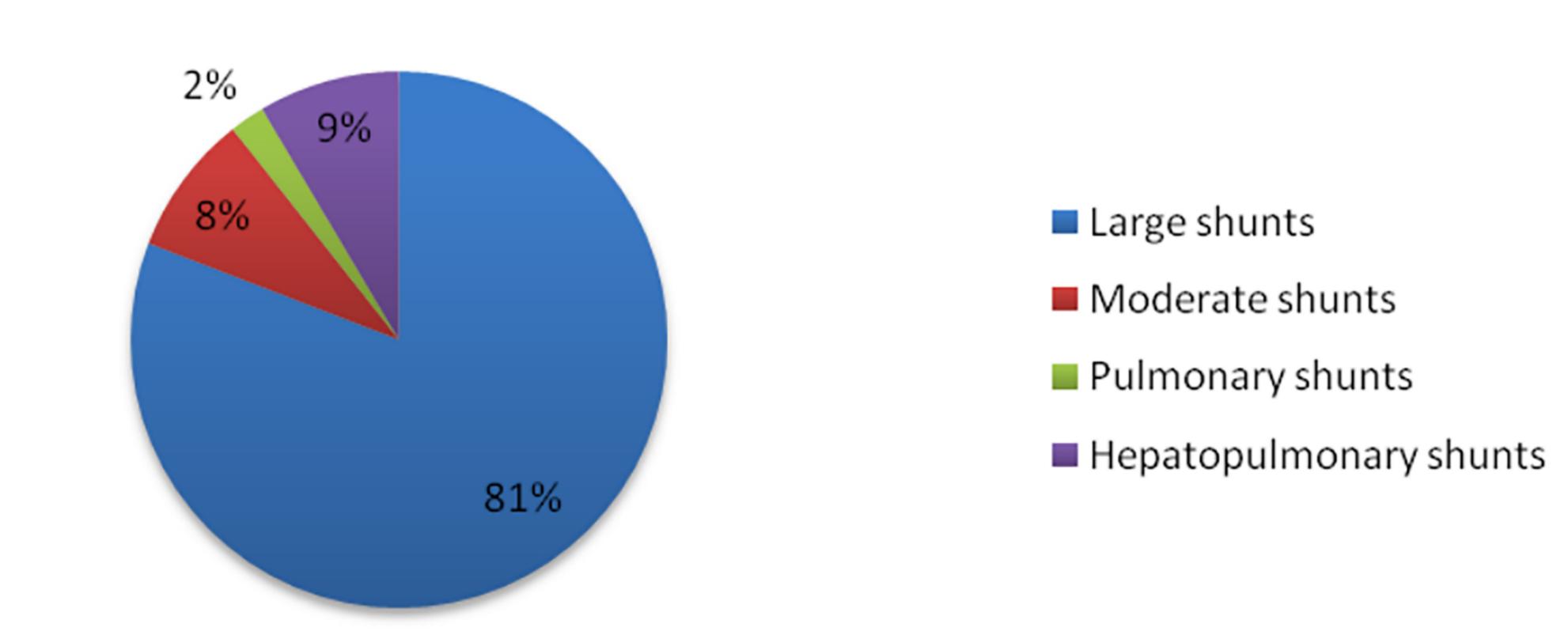
Treatment outcomes following a positive study:

- 45% had PFO closure/awaiting procedure
- 19% awaiting cardiology review for consideration of closure
- 17% PFO closure was not recommended
- All 4 patients who had a positive result for a hepatopulmonary shunt were placed on the liver transplant

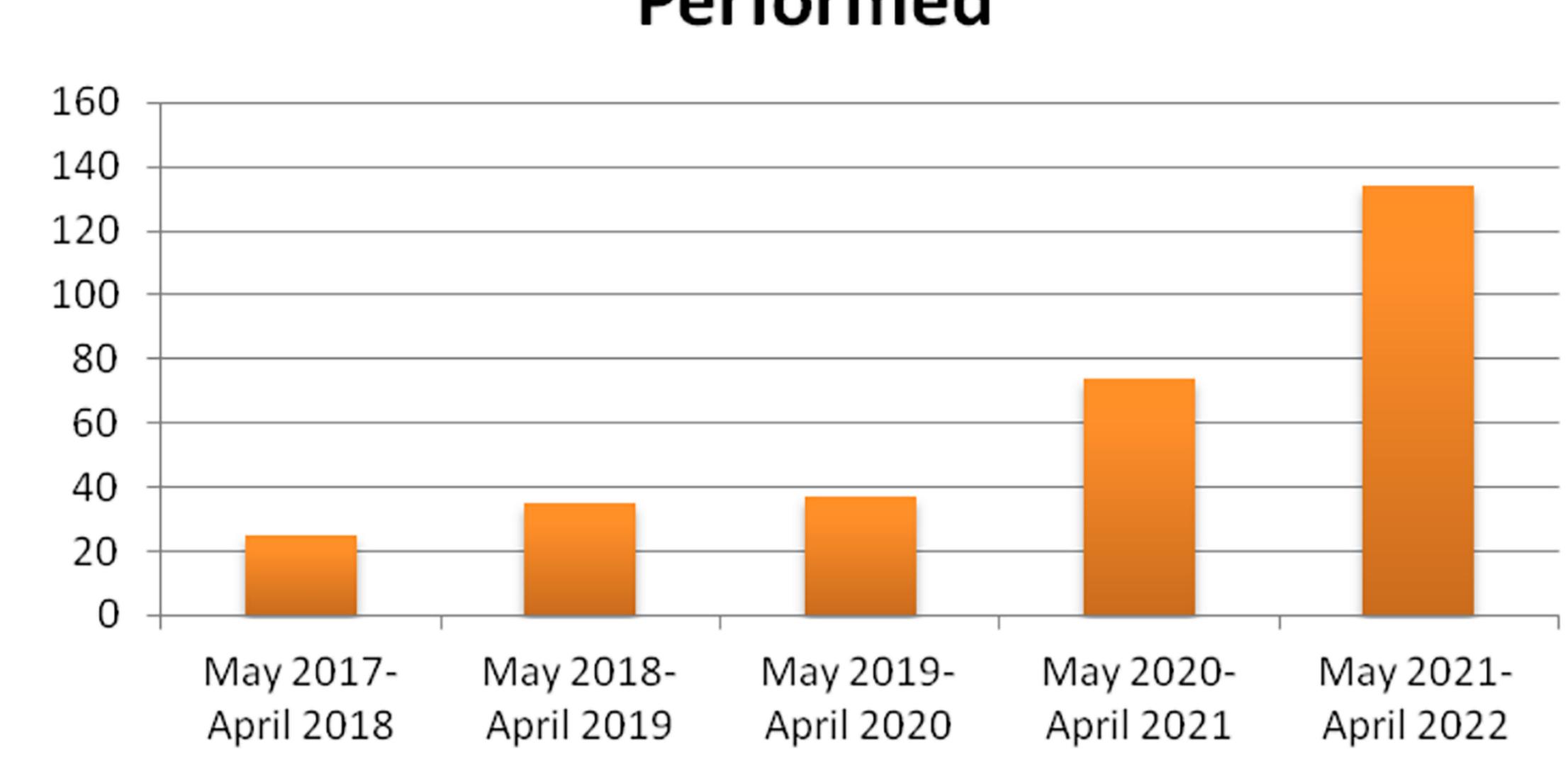
Outcomes of Bubble Contrast Referrals



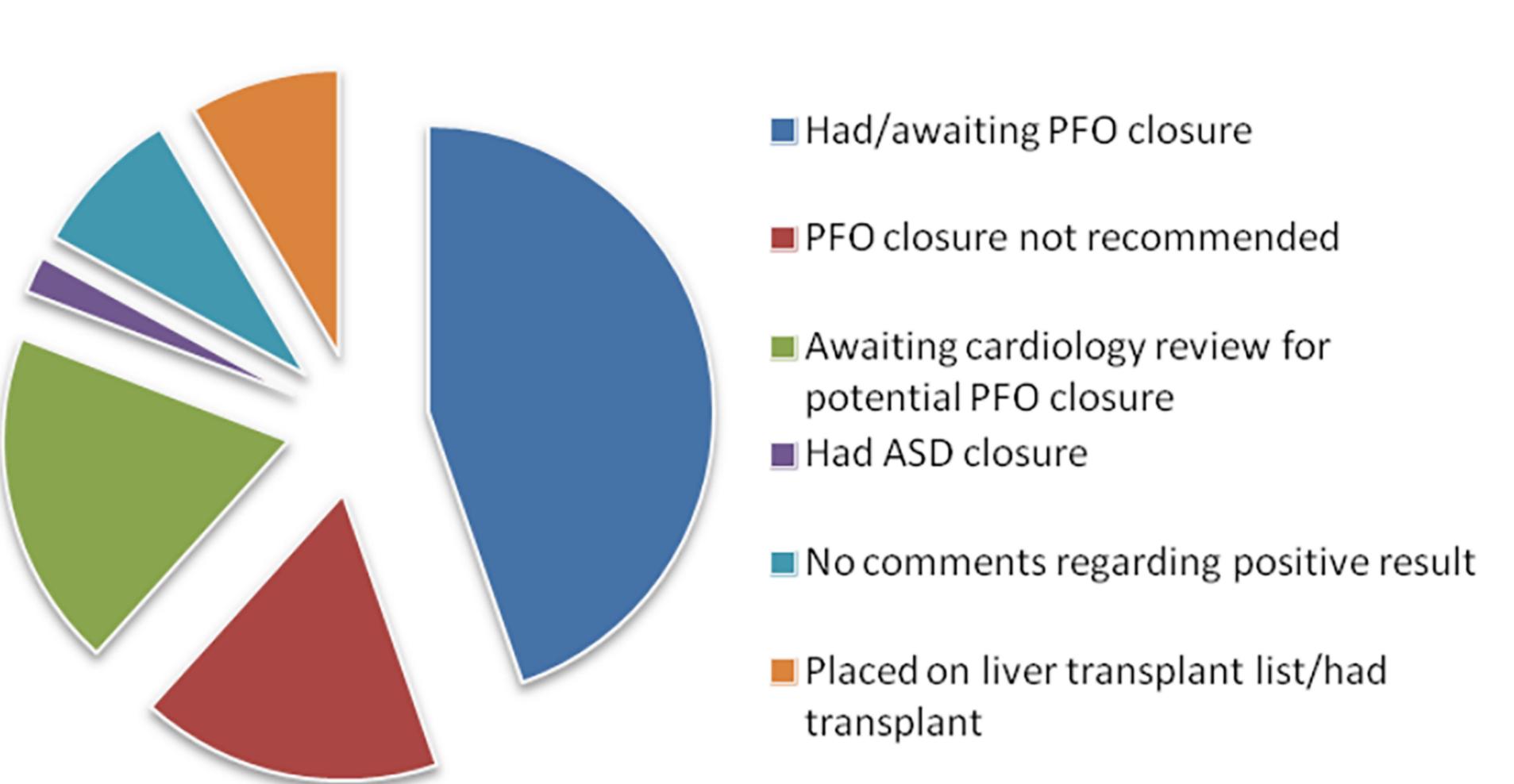
Outcome of Positive Bubble Contrast Studies



Total Number of Bubble Echoes Performed



Treatment Outcomes



Conclusion

This departmental audit provided key data highlighting the essential need for this service and how much this has grown in the last number of years. There has been >400% increase in the number of bubble echo requests, which has had a huge impact within the echo department requiring the need for a specific outpatient list/time slots being dedicated to bubble echoes to manage the waiting list, which has also required the need for more sonographers to be trained in this area. Multiple sonographers have since had cannulation training as a result of this audit. Finally, due to the increased need for the service, a departmental protocol was produced for triaging purposes, providing guidelines on age protocols and a methodology on how the test was performed.

References

Giblett, J. P., Williams, L. K., Kyranis, S., Shapiro, L. M., & Calvert, P. A. (2020). Patent Foramen Ovale Closure: State of the Art. Interventional Cardiology (London, England), 15, e15. https://doi.org/10.15420/icr.2019.27

Falanga, G., Carerj, S., Oreto, G., Khandheria, B. K., & Zito, C. (2014). How to Understand Patent Foramen Ovale Clinical Significance: Part I. Journal of cardiovascular echography, 24(4), 114–121. https://doi.org/10.4103/2211-4122.147202

