

Improving vascular access for paediatric surgical patients: A Quality Improvement Project

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Introduction

Ultrasound guidance has improved the success rate of venous cannulation in patients with difficult intravenous access. However, ultrasound-guided peripheral cannulation still has a failure rate of 45% to 56%, which is significantly higher than the 19% to 25% failure rate associated with landmark techniques¹. A lack of intravenous access can lead to missed or significantly delayed medication administration, often placing additional strain on on-call teams and negatively affecting the patient experience.

Ensuring that at least two-thirds of the catheter is positioned within the vein significantly improves catheter longevity². Selecting a device that facilitates this has been incorporated into international guidelines³.

To address these challenges, we reviewed current practices within the Anaesthetic Department at the Royal Manchester Children’s Hospital (RMCH) to identify areas for improvement.

Methods

In July 2025, Consultant paediatric anaesthetists at RMCH were surveyed over two consecutive days to assess current departmental practices for patients undergoing surgery. The survey included questions about the preferred device when using ultrasound, the approach for patients admitted for at least one night, and the recommended catheter length within the vein to minimise the risk of premature failure.

On 13th August 2025, an education-based intervention was delivered during a departmental meeting, presenting the latest evidence to support informed decision-making regarding vascular access device selection. Following this intervention, the survey was repeated on 19th and 20th August 2025 with consultant paediatric anaesthetists to determine if there was any effect from the intervention.

Results

The initial survey received 22 responses, while the follow-up survey had 20 respondents. A range of devices were reported for ultrasound-guided venous cannulation, with a greater proportion of respondents using longer devices following the educational intervention (Figure 1: short peripheral cannula 82% vs. 80%, long peripheral cannula 82% vs. 95.7%, midline catheter 63.6% vs. 75.7%).

Similarly, there was a noticeable shift towards the use of long peripheral cannulae post-intervention (Figure 2: short peripheral cannula 63.6% vs. 30%, long peripheral cannula 27.3% vs. 65%, midline catheter 9.1% vs. 5%).

In the initial survey, 63.6% of respondents correctly identified that at least two-thirds of the catheter should be within the vein to minimise the risk of premature failure. This improved to 95% following the intervention (Figure 3).

Conclusions

Delivering an educational intervention that highlighted the evidence supporting appropriate vascular access device selection has led to a notable shift in practice among consultant paediatric anaesthetists treating surgical patients. With this improved understanding, a reduction in device failure rates and the associated clinical consequences can reasonably be anticipated. This will be confirmed through an audit assessing device usage and survival rates. As the intervention utilised existing equipment and expertise, it was highly cost-effective and could be readily implemented in other departments.

References

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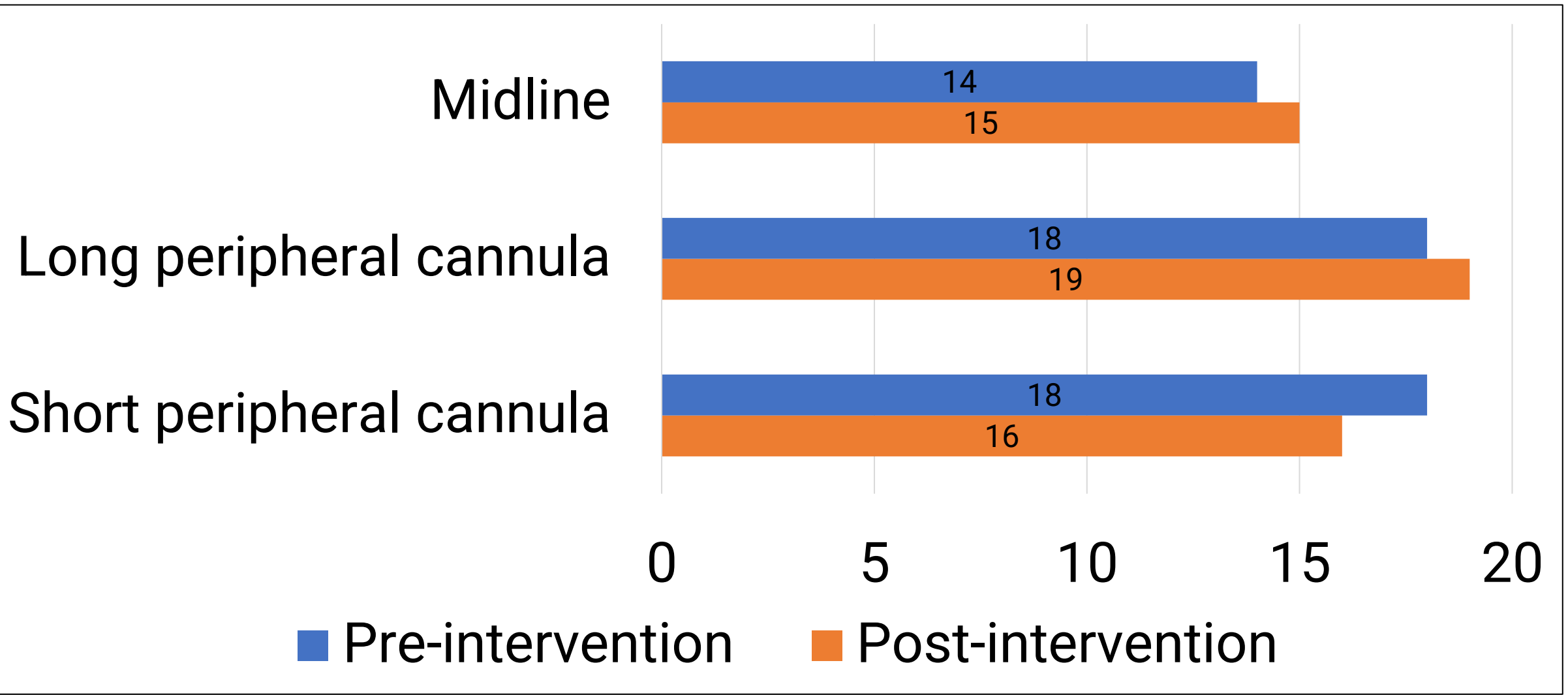


Figure 1: Preferred vascular access devices for ultrasound guided venous cannulation

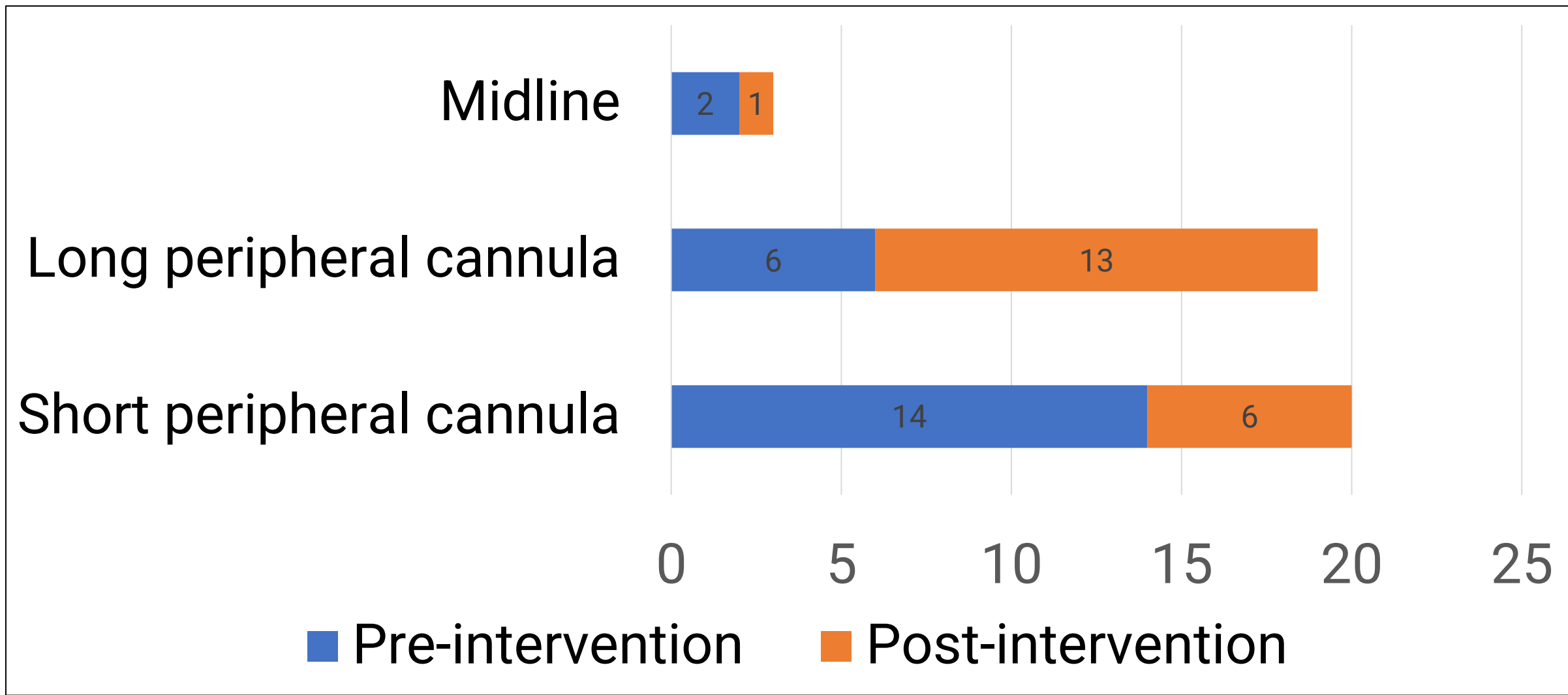


Figure 2: Routine vascular access device for patients being admitted at least overnight

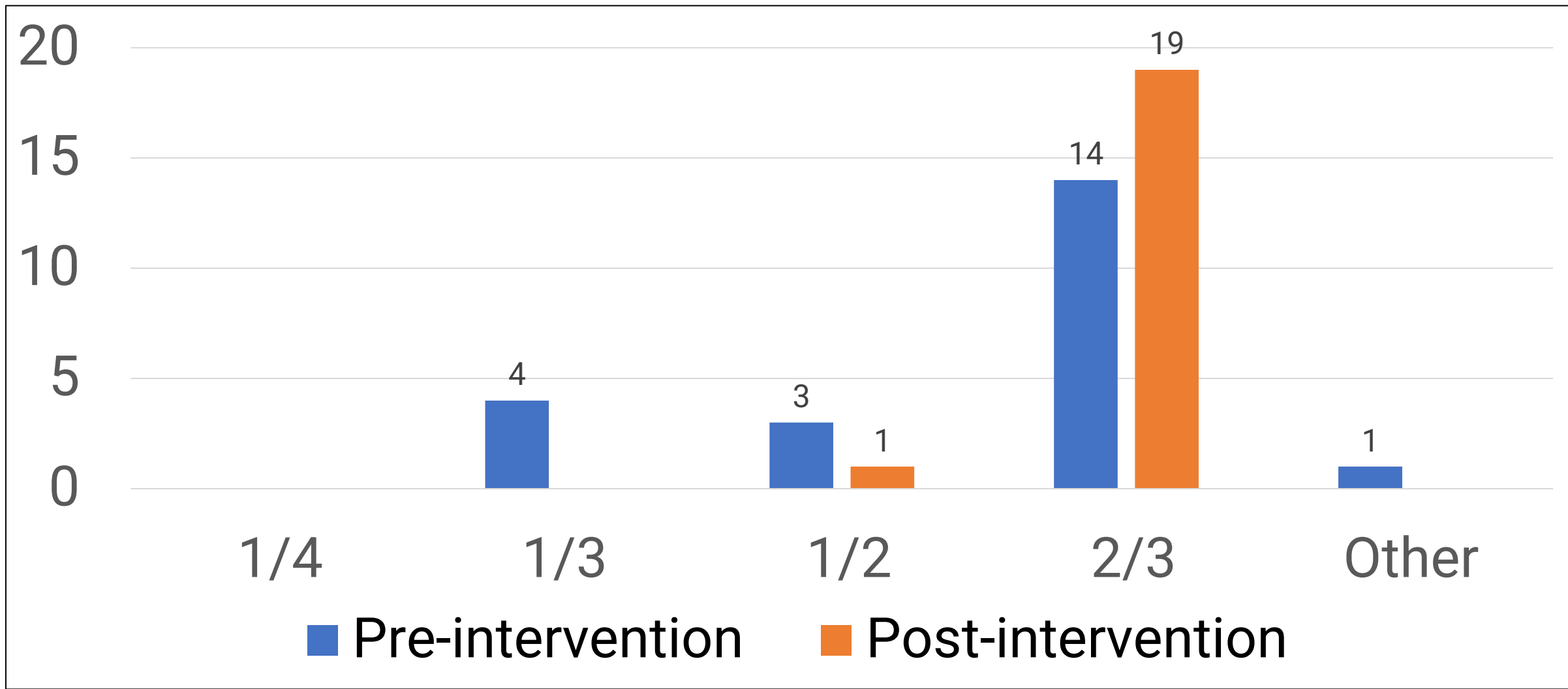


Figure 3: Proportion of catheter within the vein to minimise risk of premature failure