Medical equipment failure is a potentially overlooked source of iatrogenesis. Equipment failure caused by deviation from manufacturer use and storage specifications is an underrecognized and understudied area. We report a single instance of transesophageal echocardiogram (TEE) probe equipment failure that led to patient esophageal injury during cardiac surgery; 3 probes were placed because the first 2 did not work properly.

### Design and Methods

A multidisciplinary team investigated the equipment failure and hypothesized that improving storage conditions to manufacturer standards would reduce the frequency of TEE probe failure and thereby improve patient safety and outcomes.

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### Results

#### Focused Equipment Intervention

- 15 probes stored daily, but designed for 5 probes
- Cable is bending
- One probe per probe slot
- Built in loop to prevent bending cable
- Soft padding to protect crystals at tip
- Individual dividers to protect probe

#### TEE probe storage before and after intervention.

The number of probe repairs required per quarter was 4.4 (2.5) during the pre-intervention period and 1.0 (1.0) during the post-intervention period (mean difference 3.4, 95% CI: 1.0 to 5.9, P = 0.0006).

### Conclusions and Future Work

- The replacement of an inappropriate TEE probe storage area with an adequately-sized storage cabinet (according to manufacturer specifications) resulted in significantly fewer TEE probes being sent for maintenance.
- A reduction in equipment failure may translate to a reduction in consequent iatrogenic injury.

### Implications for Quality Improvement

- Our study provides teaching value for the use of the Gemba walk in reviewing iatrogenic injury, and the importance of considering the role of improper use and storage in medical equipment failure and in healthcare quality improvement (QI).
- Adverse events related to inappropriate use of anesthesia medical equipment is a growing and concerning trend; further QI research directed to understand the frequency and patterns associated with this area can improve safety.
- We endorse that device technology be recognized as a ‘team member’, highlighting the crucial role it plays in patient care; with performance tracked and evaluated.

### Sources