



Improving Postpartum Hemorrhage Management Through Simulation-Based Obstetrical Hemorrhage Workshops

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Background

The American College of Obstetricians and Gynecologists defines postpartum hemorrhage as at least 1,000 mL total blood loss or loss of blood coinciding with signs and symptoms of hypovolemia within 24 hours after delivery¹.

Postpartum hemorrhage (PPH) led to 11% of pregnancy related deaths in the US between 2011-2016. Up to 5% of obstetric patients will experience postpartum hemorrhage^{2,3}.

Our community-based, academic-affiliated hospitals have recorded increased cases of mortality and severe morbidity related to maternal hemorrhage.

Antepartum preparation, risk analysis, and appropriate knowledge of interventions are essential in management of PPH⁴. Simulation-based PPH workshops have been shown to improve provider comfort and patient outcomes at other institutions⁵.

Two simulation-based workshops were developed and implemented at our institution to improve appropriate identification and management of PPH.

- Workshop A was initiated in August 2019 and Workshop B was completed by August 2020.
- Workshops focused on risk assessment, team member communication and appropriate PPH workup and interventions.

Aim Statements

- **AIM1:** Through implementation of OB hemorrhage simulation workshops, we aim to improve early and accurate identification of PPH/Code Whites.
- **AIM 2:** Improve management of PPH including appropriate lab orders and fluid resuscitation.

Methods

- Simulation Workshops were implemented and completed by over 180 team members including OB providers, RNs, Anesthesiologists, and support staff.
- A chart review was conducted of a sample of 150 patients who delivered at our institution with blood loss >1,000 mL from March 2019-July 2019 (N=60), Aug 2019-July 2020 (N=60) and Aug 2020-Dec 2020 (N=30).

Outcome Measures:

- Number of Code White calls vs. the number of cases with over 1,000mL of EBL or QBL prior to, during, and after completion of both workshops
- Labs Ordered (*Type and Cross, Lactate, ABG, base deficit*)
- Fluid Resuscitation orders (*MTP calls*)
- Procedural/Surgical interventions (*rates of use of Bakri balloons, hysterectomy, hemostatic sutures*) during the time frames stated above

Results

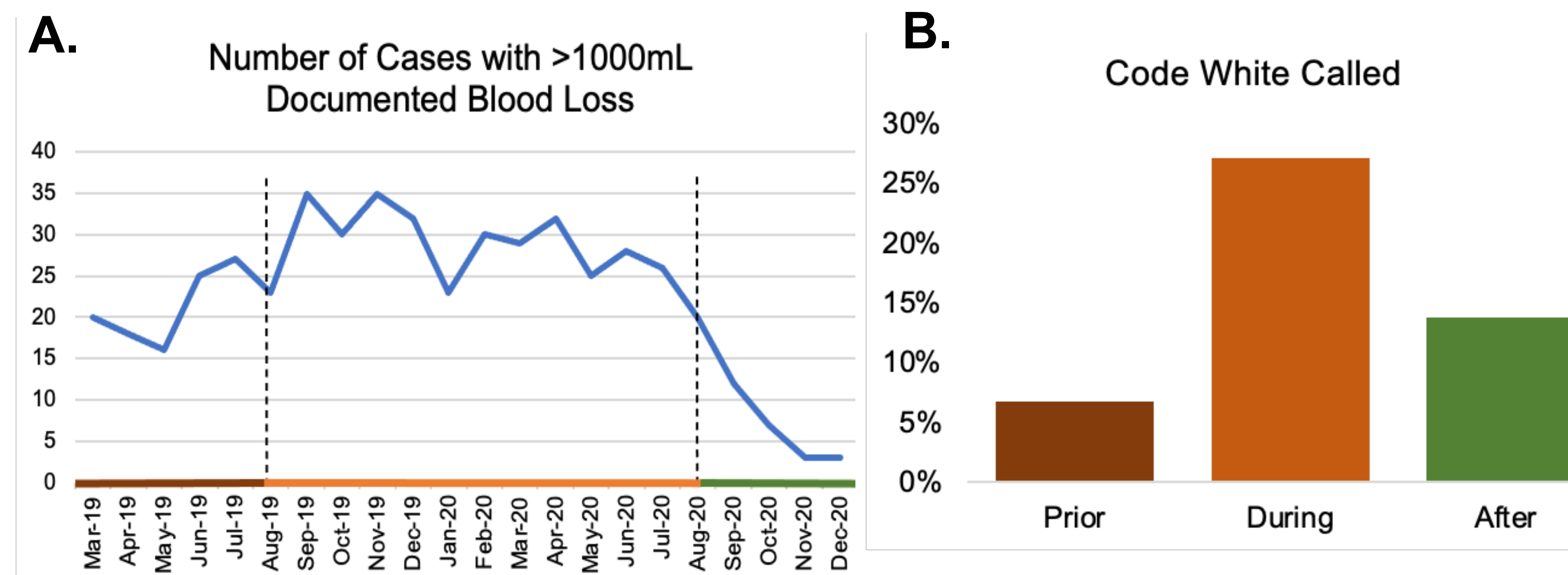


Figure 1: Number of cases meeting inclusion criteria of >1,000mL of blood loss and rates of Code Whites called prior to, during, and after completion of OB hemorrhage simulation workshops. A. The number of cases per month with >1,000mL of blood loss from March 2019-December 2020. Dotted lines indicate initiation and completion of simulation workshops. B. We investigated the number of code whites called vs. number of patients with >1,000mL documented blood loss for a cohort of 150 patients with >1,000mL blood loss. Code whites were called in 7% of cases prior to the workshops, 27% of cases during workshop implementation, and 14% of cases after the workshops.

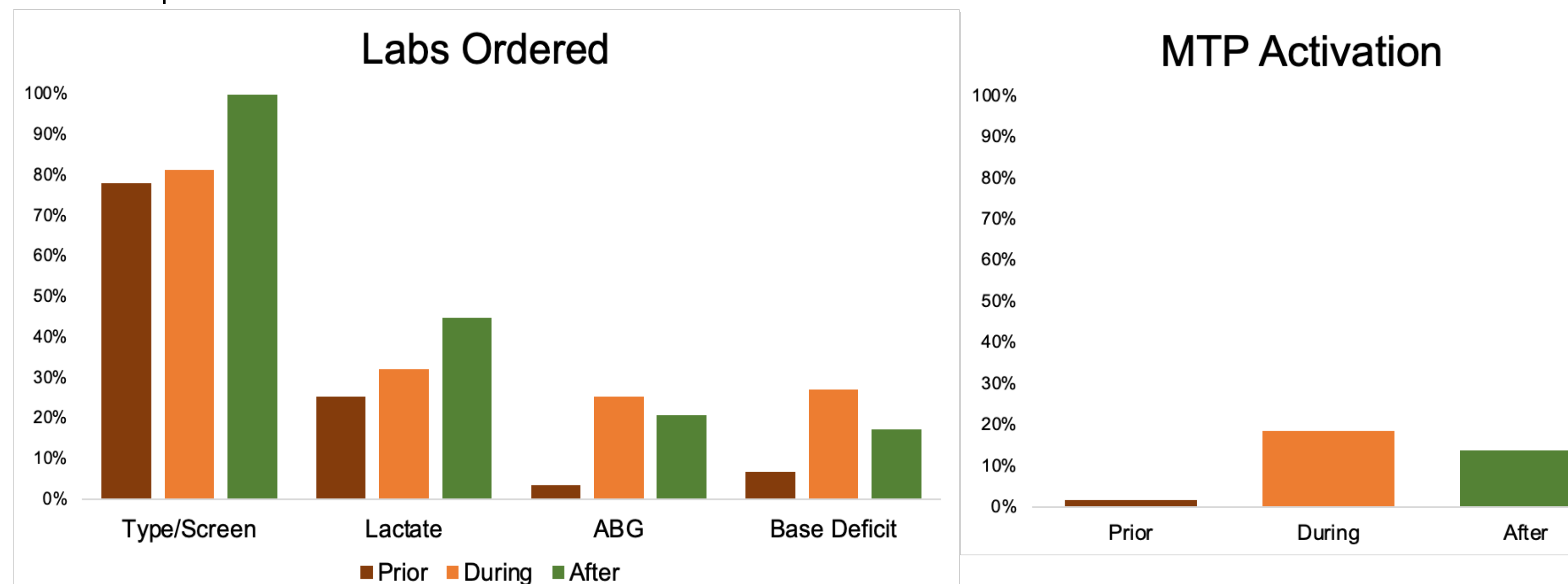


Figure 2: Labs ordered for patients who meet criteria for PPH before, during, and after completion of OB Hemorrhage Workshops. All labs were ordered more frequently after implementation of hemorrhage workshops, than prior to the workshops.

Figure 3: Massive Transfusion Protocol (MTP) activations prior to, during, and after completion of OB Hemorrhage Workshops. Massive Transfusion Protocols were activated in 2% of cases prior, 19% of cases during and 14% of cases after the workshops.

Interventional Hemorrhage Management

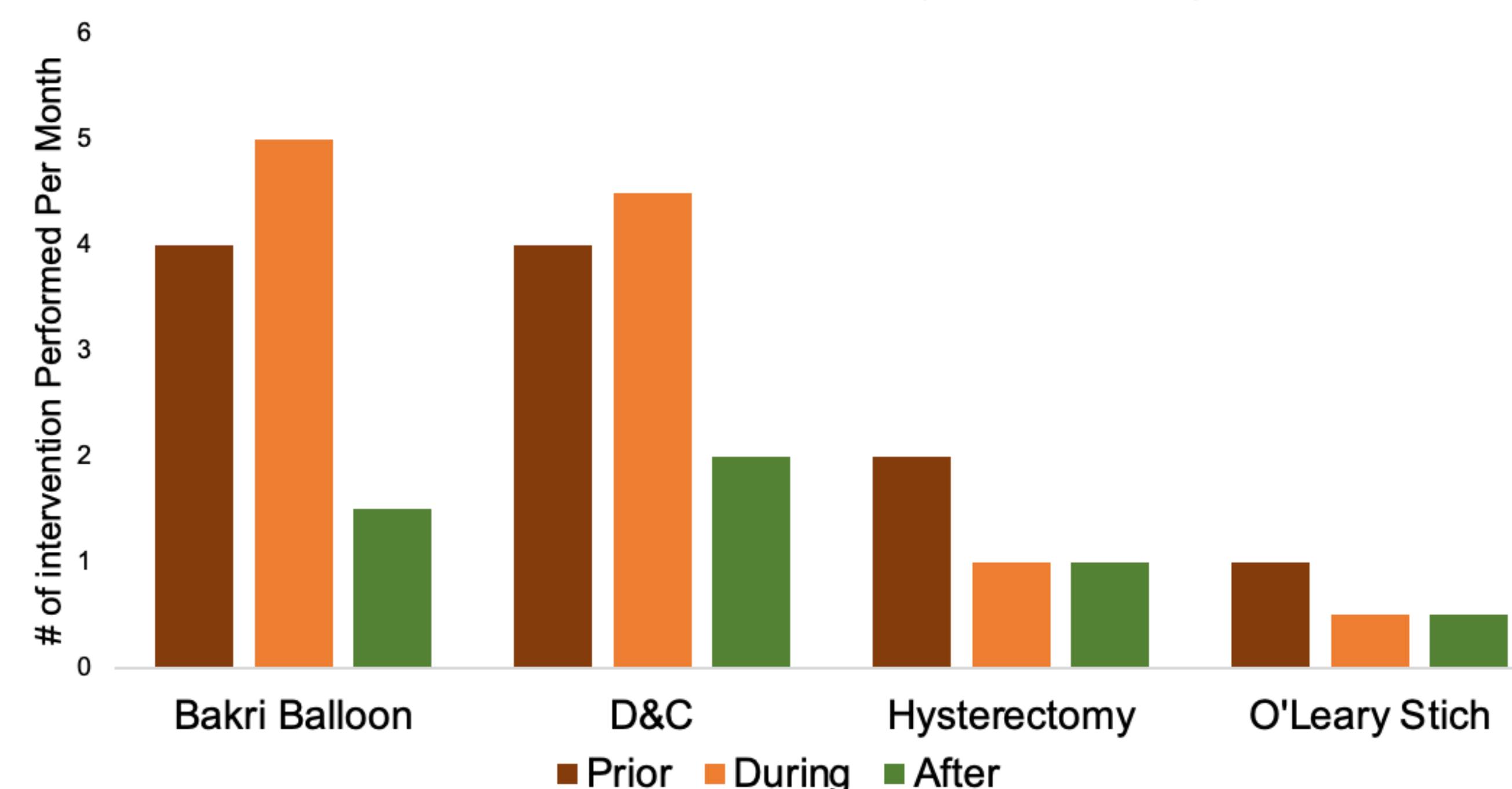


Figure 4: Rates of use of surgical/interventional hemorrhage management. We recorded instances of surgical and procedural hemorrhage control interventions before, during and after implementation of simulation workshops. The use of Bakri balloons, D&Cs, Hysterectomies and O-Leary stiches decreased after implementation of both workshops.

Discussion

- Chart review revealed increased rates of Code White activations indicating improved identification of severe PPH.
 - Improved knowledge of indications
 - Changes in institutional culture
- Overall number of cases with documented blood loss >1,000 mL decreased sharply after September 2021.
 - Transitioned from use of estimated blood loss to quantitative blood loss and Implemented Neptune suction device which aids in accurate quantification of fluid loss
 - May indicate better early management/prevention of PPH
 - Possible changes in documentation and error in accurate identification of cases for chart review
- PPH lab workup improved, as demonstrated by increased rates of orders for each indicated lab test.
 - Type and screen orders reached 100% after both workshops and percent of patients with Lactate ordered nearly doubled
- Increase in MTP activations indicates improvement in fluid resuscitation management.
- Rates of surgical/interventional hemorrhage management decreased, which may suggest more effective early medical management of PPH.
- Initial robust improvements during workshops were followed by a more modest effect after workshop completion possibly indicating diminishing response over time and need for continued education.

Future Directions

- Expand chart review.
- Investigate cause of decrease in total number of PPH cases after September 2021.
- Develop continued education plan to ensure maintenance of knowledge and skills.
- Develop systematic protocols to automatize lab orders or code white calls based on concrete values such as blood loss and patient vitals.

Acknowledgements

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References

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