



Intraoperative Antibiotic Redosing in High Blood Loss Cases for Adults

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Introduction

- Surgical site infection (SSI) is the most expensive type of hospital-acquired infection resulting in approximately \$3.5 to \$8 billion in annual cost and carries a 3% mortality rate.¹
- It is estimated that 60% of SSI's are preventable.¹
- The Surgical Care Improvement Project (SCIP) was created in 2002 to prevent costly complications associated with SSI and improve quality of care.
- SCIP measures were retired in 2015 but helped create subsequent practice guidelines.
- Large surgical blood loss (>1,500 mL) decreases antibiotic serum and tissue concentrations.²

Purpose

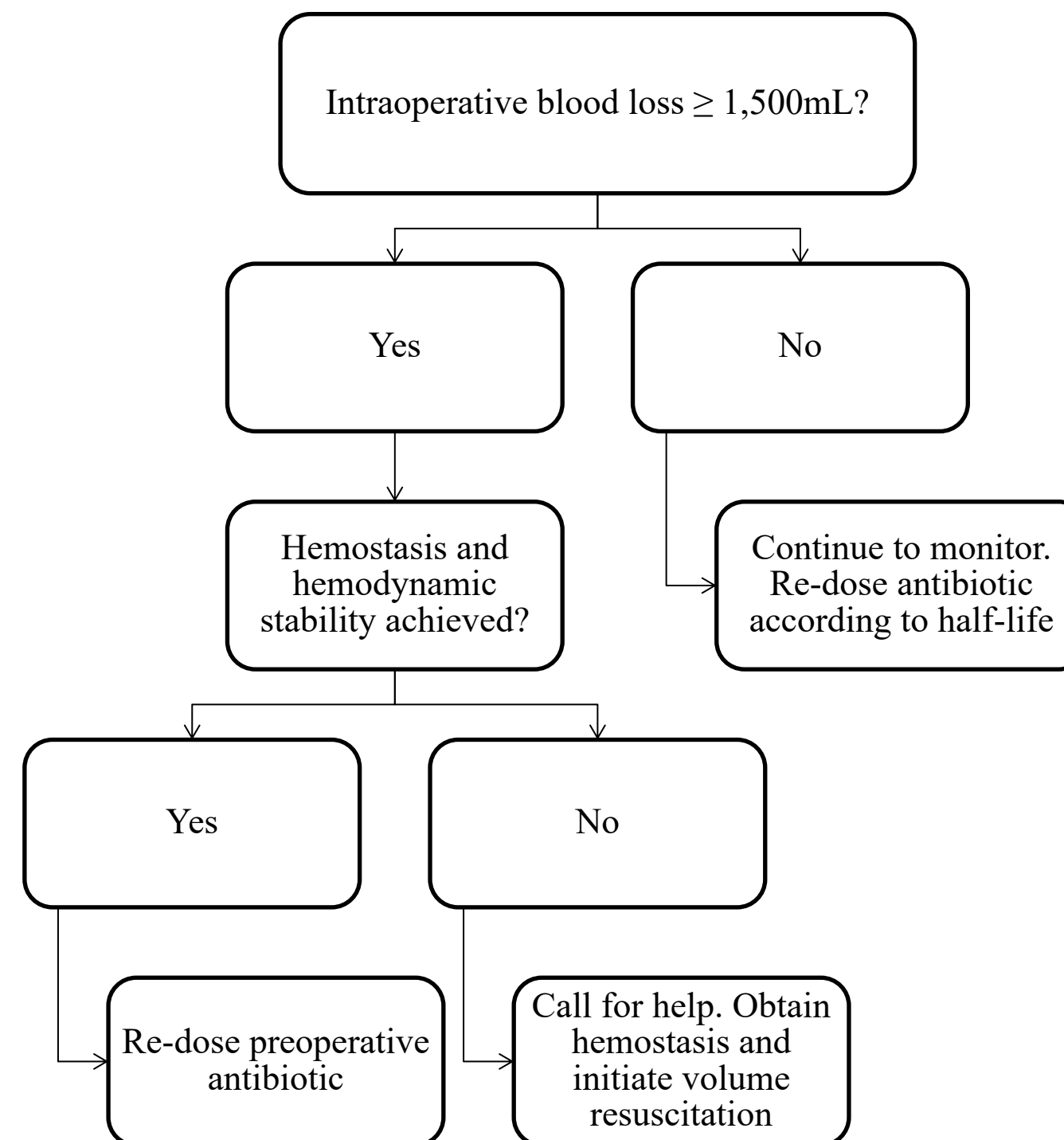
- The purpose of this quality improvement initiative is to improve antibiotic re-administration during high blood loss events in trauma, neurosurgical, and cesarean section at a level one trauma center located in mid-Michigan.
- **Clinical question:** Will the implementation of a new antibiotic redosing protocol and electronic medical record (EMR) triggers increase antibiotic redosing compliance rate in high blood loss cases by 50% before August 31, 2022?

Literature Summary

- The minimum inhibitory concentration (MIC) can be defined as the lowest antibiotic concentration it takes to inhibit bacterial growth.³
- Cefazolin concentration reduction in the blood and tissue becomes significant when blood loss is >1,500 mL, allowing opportunistic bacteria to translocate into the surgical site and bloodstream.³
- To maintain a therapeutic MIC in the plasma and tissue, antibiotic redosing is recommended when >1,500 mL of blood loss has occurred or the duration of the procedure exceeds the 2nd half-life of the antibiotic agent.²

References

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Methodology

- Initial in-person educational session was made in May with algorithmic diagram handouts made available to the anesthesia providers.
- Those who were not present during the in-person session received an email regarding the protocol with contact information.
- Collaborated with information technologist (IT) to develop an EMR trigger when blood loss >1,500 mL.
- Approval from Michigan State University Institutional Review Board and facility. Project deemed as non-research.
- Data analysis using descriptive statistics.

Results

- Project implemented May 1, 2022.
- Root-cause analysis was conducted by the QI team to determine cause of low compliance rate in June and July 2022.
- Primary cause identified as delays in blood loss documentation by obstetric nurses.
- While the overall percentage of pre-implementation and intra-implementation compliance rates did not significantly change during the project implementation phase, there was less variability suggesting improvement in compliance.
- Plans to implement a best-practice that would trigger a pop-up window within the EMR was unsuccessful due to the lack of time and resources.

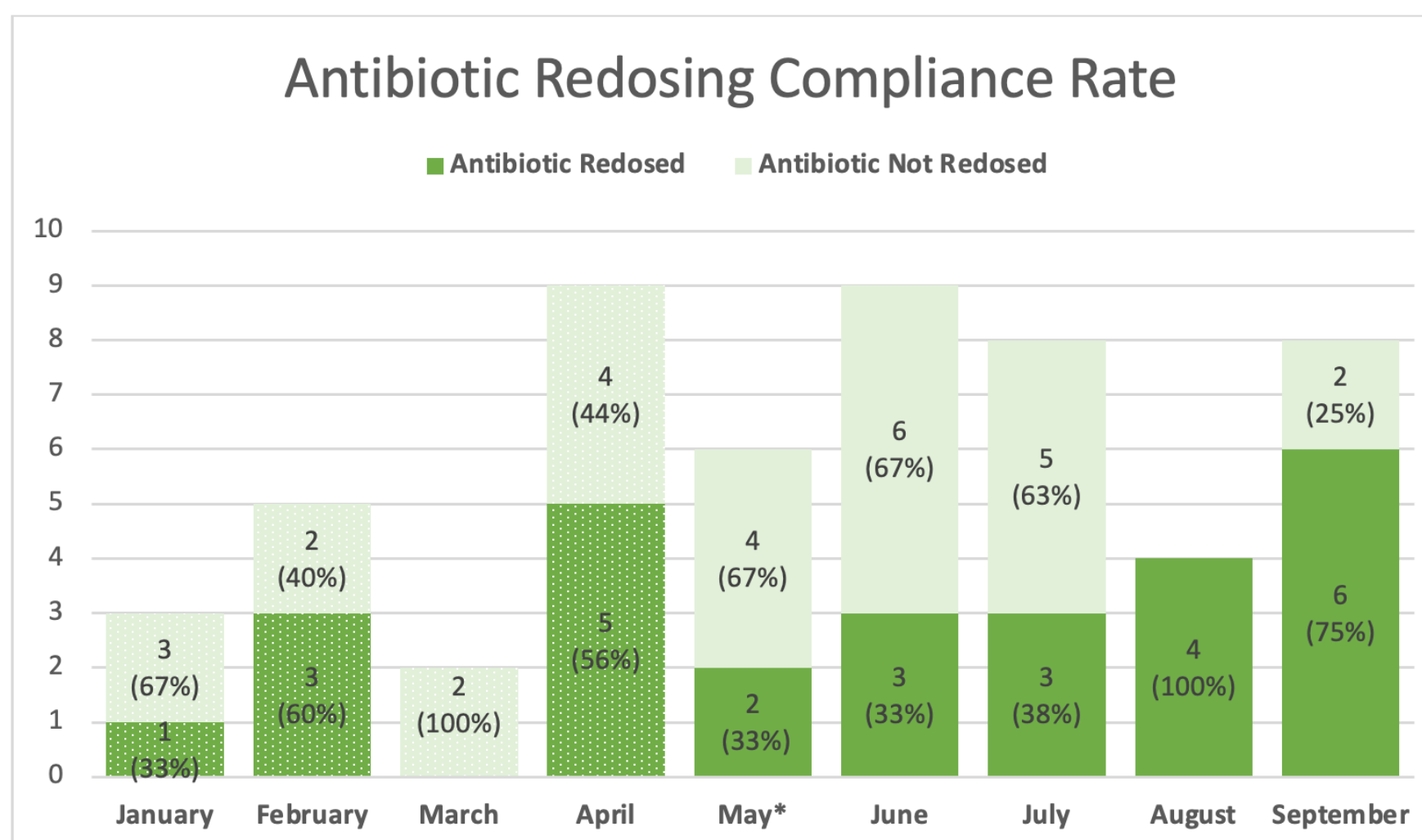
Conclusion

- High blood loss leads to decreased blood and tissue antibiotic concentration.
- Competing surgical specialty protocols influenced EMR trigger implementation.
- Multiple quality improvement cycles will be needed.

Acknowledgments

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*Project implemented May 1, 2022