Bair Gown Evaluation of Implementation: Patient comfort, Surgical Site Infection, and Cost Analysis

Elizabeth Ringer MSN, RN
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Abstract

It is a Perioperative (Periop) Standard of Care to maintain normothermia or a temperature above 36.0°C (96.8°F) for all patients receiving general anesthesia. Parkview Randallia periop area has implemented a Bair Gown Active Warming System; this paper evaluates patient comfort, staff perception, surgical site infection (SSI) rate, and cost of said system. Previously, all patients would receive passive warming via warm blankets in preop and postop and active warming in the Operating Room (OR) via a Bair Hugger Blanket. The average preop temperatures were the same before and after implementation at 97.8°C. The average in-tray temperatures showed the most improvement: 96.8°C preimplementation to 97.2°C postimplementation. Post Anesthesia Care Unit (PACU) average temperatures were lower postimplementation: 97.7°C preimplementation and 97.4°C postimplementation. We had three reportable SSIs three years before implementing the Bair System. After the implementation YTD, there is only one reportable SSI for the unit. Staff did perceive that patients had less postop shivering and overall felt warmer while utilizing the Bair System. Staff also perceived that the patients enjoyed the warming and cooling features of the gowns. The Parkview has saved an average of $3,456 monthly in linen costs at Randallia. The data temperature was pulled from sixty-seven charts.

The preimplementation collection period was from July 2022 and postimplementation data from July 2023. YTD following implementation, Randallia has lowered reportable infection rates compared to preimplementation; thereby improving our reputation in the eyes of our community. We significantly decreased unit linen costs. We have higher intraoperative temperatures with less variance throughout all phases of care. The staff have an increased perception of patient warmth and noticed less postop shivering.

Introduction

“Patients whose core body temperatures stiple 36°C are at increased risk of surgical site infections (SSIs), cardiac arrhythmias, blood loss, altered medication metabolism and increased pain” (Brooks and Malave, 2022). It is a Perioperative (Periop) Standard of Care to maintain normothermia or a temperature above 36.0°C (96.8°F) for all patients receiving general anesthesia. Parkview Randallia periop area has implemented a Bair Gown Active Warming System; this paper evaluates patient comfort, staff perception, surgical site infection (SSI) rate, and cost of said system.

Cost Evaluation

Previously, all patients received passive warming via two to six warm blankets in preop. They then would transfer to the operating room (OR) and placed on general anesthesia. The OR would use Bair Hugger blankets; the warm blankets from preop were removed and placed in sealed laundry. Once the procedure is complete, the Bair Hugger blankets would be thrown away, and the patient was covered in two to six new blankets. Once transferred to the recovery room, additional blankets would be added if temperature standards were not met. Our blankets cost $0.85 per blanket and go through a minimum of fourteen blankets per patient stay resulting in a cost of $3.20 per patient, however, most require eight to twelve blankets. The OR charges $4.54 for a Bair Hugger blanket during procedure. The department was spending an average $12.25 per patient to maintain normothermia while generating large amounts of laundry. We failed to maintain normothermia throughout all phases of care using this method. Our goal was for all patients to receive active warming before, during, and after surgery to mitigate the potential complications and costs associated with the loss of normothermia during surgery.

On October 24th, 2022, we implemented a Bair Gown system for all general anesthesia patients at Parkview Randallia. Patients are prewarmed in preop with the Bair Gown (12.59), and single flat sheet (50.20°C); both stay with the patient throughout all phases of care. The cost of the Bair System includes the Bair Gown, and Bair units. The Bair units were provided for free as long as the Bair Reps monitored and ensured that the Bair System was working appropriately.

We theorize that the decrease in the PACU’s temperatures postimplementation is from a more consistent intraoperative temperature. Previously, patients experienced a large drop in temperature in the OR, during induction, before going to a state of hypothermia. The OR staff were only able to apply the Bair Hugger Blanket. Once the patient was fully sedated, the monitors would register a low core temperature and the staff would overcompensate by turning the Bair Hugger on high. It stayed on high for the duration of the procedure even after the patient returned to their preop temperature. In July 2023, the majority of patients were warmed in PACU with a significantly higher temperature than the patient who preoperatively. The charts below depict the intraoperative temperatures. The temperatures in July 2023 have a much lower variance throughout all phases of care compared to 2022. The data reflects that the Bair System has improved our temperature consistency rate and has raised patients’ temperatures well above the target temperature thereby, reducing the likelihood of adverse outcomes related to poor temperature management.

Table 1: Prewarm vs. Postwarm

<table>
<thead>
<tr>
<th>Year</th>
<th>PACU Preimplementation</th>
<th>PACU Postimplementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Pretemperature</td>
<td>97.7°F</td>
<td>97.7°F</td>
</tr>
<tr>
<td>Average Posttemperature</td>
<td>97.7°F</td>
<td>97.4°F</td>
</tr>
</tbody>
</table>

Temperature Data

Temperature data pulled from the preimplementation period of July 2022 and postimplementation data from July 2023. Seventy-six charts from each month were audited in a preoperative, intraoperative, and a postoperative care unit (PACU) for the lowest recorded temperature during each phase of care. The same fifteen surgical providers were audited for consistency. Prior to the Bair System, the data reflected the inability to gauge how well the staff utilized the Bair System. It reflects that stable temperatures may contribute to lowering SSI. Several different studies point to hypothermia being a risk factor for surgical site infections and mortality. “Plastic incision sites have been associated with a higher rate of infection than adhesive strips to incision sites” (Savenko, 2021). The same fifteen surgical providers were audited for consistency. The data reflects that stable temperatures may contribute to lowering SSI. Several different studies point to hypothermia being a risk factor for surgical site infections and mortality.

We face several barriers during the implementation process. Staff perception and resistance was the most challenging barrier to overcome. The Bair System is a new technology for our staff. Many staff members said that the change to the Bair System was unnecessary in the beginning. While perioperative warming is a new technology, the Bair System was presented as more of a cost savings goal rather than a clinical outcome. The Bair System was presented as more of a cost savings goal rather than a clinical outcome. It was a new technology, and staff perception and resistance was the most challenging barrier to overcome.

Barriers and Limitations

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Conclusion

Year to date following implementation, Randallia has lowered the reported infection rate compared to before the implementation of the Bair System. They have lowered our outcomes, and now the Bair System is in place, it reflects that stable temperatures may contribute to lowering SSI. Several different factors may contribute to lowering SSI. The Bair System has improved our temperature consistency rate, and has raised patients’ temperatures well above the target temperature thereby, reducing the likelihood of adverse outcomes related to poor temperature management.

Surgical Site Infection

“Hypothermia itself may delay healing and predispose patients to wound infections” (Brooks and Kurz, 2000). Understanding the Dangers of Surgical Site Infection (SSI) is essential for reducing patient morbidity and mortality. The Centers for Disease Control and Prevention (CDC) define an SSI as any infection occurring within 30 days after surgery that is associated with the surgery itself. The CDC defines an SSI as any infection occurring within 30 days after surgery that is associated with the surgery itself.

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