The Effect of Pre-Operative Warming on Intra-Operative and Post-Operative Normothermia and Surgical Outcomes in ERAS Protocol Bowel Resections

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Introduction/Background

- Patients undergoing surgery risk unplanned perioperative hypothermia (temperature < 36 °C), which is linked to adverse patient outcomes.[1,2]
- Patient forced-air warming (FAW) is the pre-operative standard of care shown to improve surgical outcomes.[3]
- Current literature assessing the effect of FAW on normothermia and specific outcomes is mixed.
- **Purpose:** Evaluate the effect of FAW on surgical outcomes of adult patients undergoing elective bowel resection according to ERAS (Enhanced Recovery after Surgery) protocol.

Aims

- **Aim 1:** Evaluate the effect of pre-operative warming on specific surgical outcomes.
- **Aim 2:** Contribute to the body of evidence supporting pre-operative patient warming as a safe and effective intervention.

Methods

- **Design:** Prospective observational study and program evaluation.
- **Sample:** Convenience sample of 45 cases meeting inclusion criteria of ≥ 18 years of age undergoing ERAS-protocol elective abdominal surgery by two participating colorectal surgeons and receiving perioperative warming in accordance with Guidelines for Perioperative Care in Elective Colorectal Surgery Recommendations.[4]
- **Procedure:** Forced-air warming was initiated immediately after changing into the Bair Paws® Model 850 Warming Unit Gown (Figure 1). Patient temperature readings were collected in 1) Pre-Op upon arrival, 2) Pre-Op after FAW, 3) Operating Room upon arrival, 4) Operating Room one hour after incision, and 5) Phase I Recovery entry.
- **Analysis:** Descriptive statistics and t-tests.
- **Outcomes:** Phase 1 Recovery length of stay (LOS), hospital LOS, presence of surgical site infection (SSI), and blood transfusion during hospitalization. Demographic and past medical history were collected.

Figure 1: Bair Paws® Model 850 Warming Unit Gown, Infection Prevention Division 3M Health Care, 2013.

Results

- **Sample:** 19 of 45 patient cases (8 males and 11 females) included in data analyses.
- 89.5% of patients warmed in Pre-Op (17 of 19 patients) were normothermic in Phase I Recovery (Figure 2).
- Average Phase I Recovery LOS was 136.2 minutes (range 52 to 262 minutes). The average Phase I LOS for patients aged ≤ 65 years was significantly different than those ≥ 66 years (≤ 65 years: 110 minutes; ≥ 66 years: 165.2 minutes, p = 0.06). There was no difference in Phase I Recovery LOS between males and females.
- Average hospital LOS was 4.7 days (range = 1 to 20 days). Male (m) patient average LOS was significantly different than female (f) patient average LOS (m = 6.9 days, f = 3.2 days, p = 0.07). There was no difference in LOS for patients aged ≤ 65 years and those ≥ 66 years.
- No reported SSIs.
- 5.2% (1 of 19 patients) received a blood transfusion.

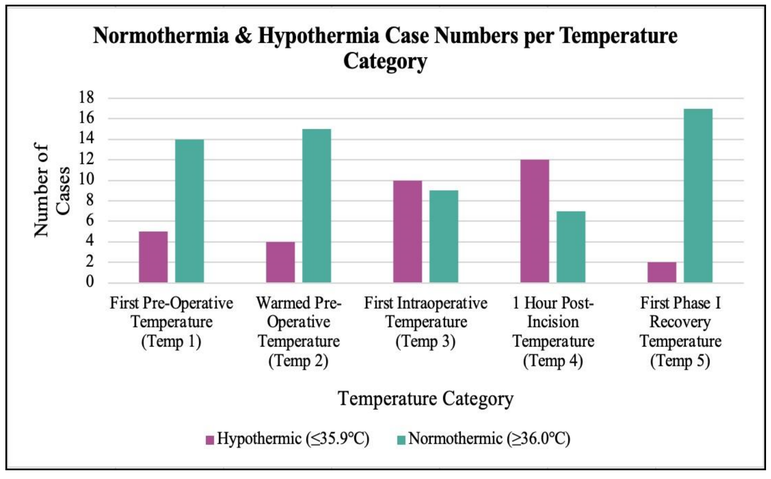

Figure 2: 89.5% were normothermic in Phase I Recovery. Average patient temperature (Temp 1 = 36.3°C) increased after pre-op warming (Temp 2 = 36.5°C), decreased upon arrival to OR (Temp 3 = 36.0°C), decreased at 1 hour post-incision (Temp 4 = 35.7°C), and increased upon arrival to Phase I Recovery (Temp 5 = 36.3°C).

Discussion

- Majority of warmed patients were normothermic in Phase 1 Recovery.
- Patients ≥ 66 years of age had a significantly longer average Phase 1 Recovery LOS than those ≤ 65 years of age.
- Male patients had a significantly longer hospital LOS than female patients.
- No SSIs reported after 90 days; 1 patient required a blood transfusion.
- Positive patient outcomes (SSI and blood transfusion rates) support pre-op FAW as safe and effective.

Conclusion/Implications for Practice

- Warming is a safe intervention as positive patient outcomes occurred, and no adverse events were reported.
- Small sample size (N=19) limits generalizability. 26 eligible surgical cases were not included due to lack of documentation of presence or absence of pre-op FAW.
- No change to current clinical practice is recommended.
- Further research warranted in this patient population as the incidence of colorectal cancer rises in the United States.[5]

References

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