LMA PerfecTemp vs. Forced-air Warming
Intraoperative Warming

Hypothermia
• Causes many complications
• Maintaining normothermia is now standard-of-care
• “Pay-for-performance” measure

Warming methods
• Forced-air is by far the most common
  – Disposable element
  – Requires positioning
  – Cost ≈$9
• Under-body warming
  – Circulating-water nearly ineffective
  – Not disposable
  – Low per/patient cost
  – New resistive systems now available
LMA PerfecTemp Warming System
What is LMA PerfecTemp?

Patient Warming System with Pressure Reduction. Designed to be used during surgical procedures to maintain patient normothermia (36°C) perioperatively or during diagnostic procedures.

The conductive heating element warms a layer of pressure reduction foam directly beneath the patient. Fiber optic sensors monitor the interface temperature for patient safety.
PerfecTemp Patient Warming System with Pressure Reduction
1. Fabric cover
   - Non-porous
   - Antimicrobial/antifungal
   - Tear & puncture resistant
   - Stain resistant

2. Visco foam
   - Provides the pressure reduction

3. Heating element
   - Printed Ink
   - Uniform heat
   - Radio translucent
   - Temp control to 1/10°C

4. High resilience foam for support

5. Kevlar stocking wraps foam & heating element
   - Kevlar is fire retarding layer
Fiber Optic Temperature Management System

Measures the interface temperature of the skin and the pad cover

Provides the highest degree of safety to prevent over-temp

X-ray translucent

Only one sensor needs to be covered
Control Panel

1. Standby button
2. Digital display
3. Alarm mutes
4. Sets display to °C or °F
5. Temperature selector
6. Event code button
Pad Cover

Made from Dartex™ material

Stain & Puncture resistant

Biostatic anti-mycotic coating
  • Impenetrable barrier to virus and bacteria

MVP/MVT breathability optimizes patient comfort

Anti Shear

Anti Decubitus

Fluid proof

Flame retardant
Why PerfecTemp?

Clinical Benefits

- Warms 95%+ of the patients with no set-up or added decision
- Provides normothermia without the risk of burns
- Includes pressure reduction
- Only warming system that monitors the interface temperature of patient (safety)
- It does not blowing air so it’s totally silent with no chance of potential increase risk of contamination
Why PerfecTemp?

Financial Benefits

- Pays for itself, by significant reduction of disposables
- Can generate hundreds of thousands of dollars in savings
- Reduces ordering, stocking and administrative costs
- Consumes 10X less energy than Hot Air, which also expels most of its energy into the atmosphere result in more A/C work.
Why PerfecTemp?

Process Improvement Benefits

• No set-up time – quick OR turn around
• All patients are automatically warmed
• A GREEN product – reduces disposable waste and costs
• There’s no interference with surgical access
Comparison of Warming Practices

1988 Art                   New Technology
Force Air                           PerfecTemp

Thermal images taken at the University of Washington demonstrate that PerfecTemp warms more surface area than forced air.
Intraoperative distal esophageal (core) temperature with PerfecTemp warming is non-inferior to upper-body forced-air warming in patients undergoing major open abdominal surgery under general anesthesia.
Subject Selection

Inclusion

• Major open abdominal surgery
• Scheduled for \( \geq 2 \) hours
• BMI 20-36 kg/m\(^2\)
• ASA Physical Status 1-3
• Supine position (with or without lithotomy)

Exclusion

• Pre-operative fever
• Serious skin lesions
• Contraindication to PerfecTemp or forced-air warming
Protocol

General anesthesia
- No restriction on technique
- Fresh-gas flow = 2 L/min; all IV fluids warmed
- Ambient temperature ≈20°C

PerfecTemp
- Set to 40°C; activated before patient positioning
- A single cotton blanket positioned over patient

Forced-air
- Upper- or lower-body cover
- Positioned before draping
- Activated to “high” after draping
- Covered with a single cotton blanket

Rescue if PerfecTemp patients core temperature <35°C
Measurements

Anesthetic and surgical factors

• Anesthesia duration
• Intubation time
• Drugs

Temperatures

• Pre-operative oral
• Intraoperative, Q15 minutes
  – Distal esophagus
  – Ambient
  – Skin at the scapula

Other measurements

• Time of forced-air activation
• Rescue: time and treatment

Posterior skin integrity

• Pre-op, post-op, and first postoperative morning
Data Analysis

Statistical plan
- Non-inferiority for distal esophageal temperature
- Area under the curve (36°C baseline)
- Two one-tailed t tests, 0.5°C buffer

Sample-size estimate
- Standard deviations in previous similar studies are ≈0.6°C
- 60 patients gives 90% power for non-inferiority, alpha = 0.025

Sample size
- Some patients have shorter-than-planned operations
- Will enroll 70 patients
- ≤2 patients/group for "de-bugging"