Continuous Temperature Monitoring in the Inpatient Setting Using TempTraq

Megan Sampson, MD[1], Victoria Hickey, RN[1], John Huber, MSc[2], Priscila Davila, MD[1], Jon Eager, BSEE[3], Stella Davies, MBBS, PhD[1], Christopher Dandoy, MD, MS[1]

[1]Division of Bone Marrow Transplant and Immune Deficiency, [2]Division of Information Services, Cincinnati Children's Hospital Medical Center, OH, USA, [3]Blue Spark Technologies, Westlake, OH, USA

Background

- Blood stream infections occur in nearly 30% of patients undergoing hematopoietic stem cell transplant (HSCT) and fever is often the first symptom
- Timely administration of antibiotics is associated with improved outcomes, thus, early recognition of fever is paramount
- Current standard of care includes episodic monitoring of temperature in hospitalized patients, which may delay fever detection. Therefore, continuous real-time body temperature measurement may detect fever prior to the current SOC
- TempTraq (Figure 1) is a Food and Drug Administration cleared class II medical device and consists of a soft, comfortable, disposable patch that continuously measures axillary temperature and wirelessly transmits real time-time data

Objective

- The primary aim of the study was to evaluate the feasibility, safety and tolerability of continuous temperature monitoring in HSCT patients using TempTraq

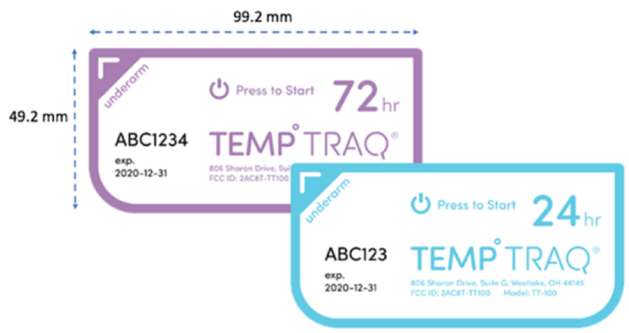

Figure : TempTraq Temperature Probe. Once activated, TempTraq continuously monitors axillary temperature for up to 24 or 72 hours per patch, and issues alerts when temperature rises.

Methods

- We performed a prospective observational study of pediatric patients (1-17 years of age) undergoing HSCT at Cincinnati Children's Hospital in Cincinnati, Ohio.
- Enrolled patients wore a TempTraq patch for 5 days.
- A 1-10 rating scale survey was completed by the parent/guardian at the end of the study to determine tolerability, ease of use, satisfaction and desire for future use in the inpatient and outpatient setting.
- Temperature data from the TempTraq patch was compared to the standard episodic temperature monitoring to determine detection of febrile episodes.

Results

- Ten patients were enrolled and completed the study
- The TempTraq patch was well tolerated by study subjects (mean tolerability rating of 9.1/10).
- One patient developed skin breakdown at the site of the TempTraq patch attributed to concurrent Thiotepa administration.
- The patch was easy to apply with an easy of application rating of 9.8/10.
- Parents were overall satisfied (rating 8.4/10) and would like to use the TempTraq patches in future hospitalizations (rating 8.9/10) and at home (rating 9.2/10).

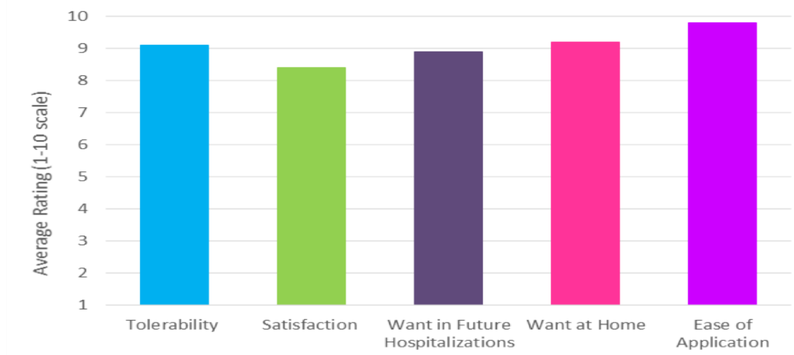

Figure 2: Survey results following completion of study to assess tolerability, satisfaction, ease of use and desire for use in the inpatient and outpatient settings.

Results (continued)

- TempTraq patch identified fever (≥ 100.4 ° F) in 6/10 patients. The fever was never detected by episodic monitoring (SOC) in 2/6 patients. In 2 patients, SOC failed to detect fever for over 12 hours.

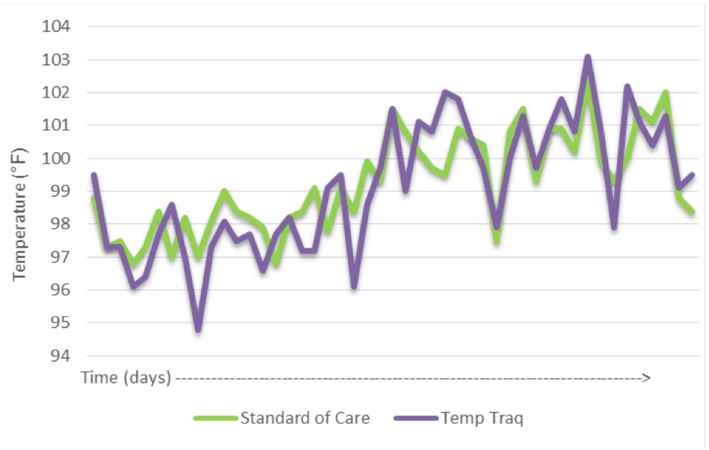

Figure 3: Temperature data from study patient showing correlation of temperature data from TempTraq patch and standard of care

Conclusions

- Continuous temperature monitoring via TempTraq was well tolerated in pediatric HSCT patients.
- Timely fever detection was improved in TempTraq over the current standard of care.

Further Research/Future Plans

- With proof of feasibility, safety and tolerability, we will advance the study to the inpatient and outpatient setting.
- The inpatient study will use the temperature data collected in real-time to improve timely administration of antibiotics
- An outpatient feasibility study will be completed