Golden Hour for Extremely Premature Infants: Improving time to Normothermia and Administration of IVF and Antibiotics

Amina Habib MD, MHA, Rayelinn Leukhart NNP, Thomas Bartman MD, PhD, Amy Brown MD and Golden Hour QI Workgroup Ohio State University

Primary Author: Amina Habib, MD, MHA amina.habib@nationwidechildrens.org 847-477-0786

**Aim:** We aim to improve the successfully competed rates of golden hour stabilization by 135 minutes of life from 17% to 80% by 1/31/2016 and sustain these rates indefinitely. We define complete stabilization as achieving and maintaining neutral thermal environment (normothermia), rapid treatment of presumed sepsis, and prevention of hypoglycemia with timely IV glucose and protein administration.

**Setting:** Nationwide Children's Hospital NICU at The Ohio State University Wexner Medical Center (NCH-OSU campus) which is a delivery hospital with 4500 deliveries per year and total of 800 beds. The NICU is a LEVEL III Unit with 49 beds and 1200 admissions a year. On average there are more than 100 <28week admissions.

**Mechanisms:** Our center has a Small Baby Protocol since 1/2011 implemented through a detailed order set and guidelines for each discipline. However, in 2014 our time to complete resuscitation on average was 215 minutes. Our multidisciplinary Golden Hour QI Team was formed in October 2014 and through the process mapping timeline we identified both our key drivers and the time-specific goals. The tasks we identified requiring majority of the time were maintaining normothermia, establishing access, and administering antibiotics and IVF. Our key drivers are divided into two process areas first of which require improved multi-disciplinary communication and the second area requiring inter-departmental cooperation and efficiency (Figure 1).

**Methods:** We started a small baby huddle to share information between disciplines regarding patient information, treatment plan, and role assignment. We created a real-time feedback mechanism through our golden hour timeline bundle which collects data for our project plus is a quick small baby skill review for nursing. For the ordering clinicians, we developed an order set checklist to help streamline the treatment plan and ordering process. With our second PDSA cycles we improved our golden hour timeline bundle to facilitate inter-disciplinary task awareness and time-sensitive warmer reminders for maintaining normothermia. We also started using temperature probes that provide more frequent temperature readings allowing for adjustments as needed.

**Measures:** These measures are collected at each small baby admission and displayed in our unit quarterly.

- **Outcome measures**
  - Time to achieve normothermia: defined as time elapsed from birth to first two temperatures \( \geq 97.5 \) taken 15 minutes apart.
  - Time to antibiotic administration: defined as time elapsed from birth to first dose of antibiotics
  - Time to IVF administration: defined as time elapsed from birth to starting of maintenance IVF administration

- **Compliance measures**
  - Compliance with timeline bundle, order set checklist, and mandated huddles (admission /debriefing)

- **Balancing measures:** Mortality rates comparing prior to and post implementation of workgroup

**Data:** We have decreased our time to achieve normothermia from 215 to 90 minutes (Figure 2). Although variation in time to receive antibiotics has decreased, we continue to experience delays in our time to achieve antibiotic administration highlighting the need for future work (Figure 3). While there is decreased inter-patient variance in our time to antibiotics administration we are currently far from goal (Figure 4). Our timeline bundle compliance has been increasing steadily from 72% to 100% (table 1). We have found no change in our mortality rates of less than 20%.
Discussion: By implementing process improvements focused on efficiency and communication we have changed the longest task to complete resuscitation maintaining normothermia into the shortest, surpassing our goal. However, our current hurdle to improving antibiotics administration times is establishing access and supporting nursing processes. Our next PDSA cycle is providing more tools to each discipline in plans to increase task-specific effectiveness and overall quality and safety. We have identified discipline specific time to action goals so all in the stabilization team recognize the time they have to complete their tasks. To support increased time-efficiency, we will be providing procedure carts and nursing admission bundles therefore all supplies are easily obtained.
Aim

Improve the percentage of infants born <28 weeks receiving complete resuscitation within 135 minutes of birth from 17% to 80% by 1/31/2016 and sustain indefinitely

Design Changes

Department

- Admission Huddle: role assign → DR set-up
- Timeline Bundle: real-time DR times measurement
- On-going dept discussion: response times, dedicated real-time image machine
- Stock imaging plate in unit

Key Drivers

Achieving Normothermia

- L&D Resources
- Nursing Temp monitor
- Vascular Access

Physician/NPN

Line imaging Line placement

Quicker access = Stable temps

Physician/NPN

Order Placement

Quicker access = Quicker administration

IVF and Antibiotics

- Pharmacy Order Delivery
- Physician/NPN Order Placement
- Nursing Administration

Design Changes

- Timeline Bundle: skills review → bed setup
- Temp Probe: Adjust temp
- Timeline Bundle: Reminder Call X-ray STAT Report delayed films
- Review Procedural Skills Procedure Cart
- Admission Huddle: discuss plan with team
- Order set change: IVF/ Antibiotics STAT
- Team communication for line connection
- Document nursing staffing Nursing Supply Admission Bundle

Golden Hour QI Workgroup

Team Leads: Dr. Amy Brown, Dr. Amina Habib, Rayelinn Leukhart
Physicians: Dr. Bartman, Dr. Chicoine, Dr. Logan, Dr. Stenger
QI Team: Dr. Bapat, Greg Rhysen
Pharmacy: Kristen Gawronski, Pharmacy Workgroup
Nursing: Kaylan Campbell, Erin Cullen, Niki Hackett, Sarah Hostetler, Susie McCale, Jennifer Thompson, Ashley Turner

Figure 1: Golden Hour Key Driver Diagram
Figure 2: Control chart demonstrates downward trend after the first PDSA cycle (mean decrease of 20 minutes). The significant decrease is after the second PDSA cycle (mean decrease of 60 minutes).

Figure 3: Control chart shows decrease variance from patient to patient after first PDSA cycle with downward trend after the second PDSA cycle (overall mean decrease of 60 minutes).
Figure 4: Control chart does not show a downward trend or an upward trend despite change in supplies in September. The third PDSA cycle is focused increasing ease in retrieving nursing supplies for administration.

Table 1: Table shows improving compliance from the first to second PDSA cycles. Compliance measurement is dependent on data sheets being turned in and therefore misplaced sheets are not included in compliance. The third PDSA cycle reflects personnel request for debriefing instructions.