Improving 1-Month Hepatitis B Vaccination Timeliness in Very Low Birth Weight (VLBW) Infants in the NICU: Assessment of Provider Knowledge and Perception

Arjun Patel, Ryan Moore, MD

**Introduction**

- American Academy of Pediatrics Hepatitis B recommendations for babies born to HBsAg (+) mothers:
  - Infants > 2000 g: Initial dose at birth (<24 hours)
  - Infants < 2000 g: Initial dose at 1 month of age or hospital discharge
- Very low birth weight infants (VLBW; <1500 g) demonstrate increased immunological response with deferral of hepatitis B vaccination until 1 month.
- Current studies indicate effectiveness and relative safety of the hepatitis B vaccination.
- VLBW infants continue to have a delayed immunization or complete lack of initial hepatitis immunization which results in discharge without protection, delay of their vaccination series, and reduced effectiveness of future vaccinations.

**Methods**

- **Location:** NICU at VMC, 50 bed Level IV NICU
- **Team:** Neonatologist, Medical Student, Nursing, Pediatric Pharmacist
- **AIM Statement:** Improve timeliness of 1-month Hepatitis B vaccinations to VLBW (<1500g) infants in the NICU to 80% by 03/2020

**Baseline vaccination timeliness:** identified by cross referencing NICU admission data with hepatitis B vaccination records (01/2019-09/2019)

**PDSA 1:** Staff Survey
- **Primary goal:** identify perceptions and limits regarding VLBW vaccination to guide future education
  - **Multiple Choice Questions:**
    - Profession
    - Timeline for vaccination delivery
    - Reasons to defer hepatitis B vaccination
    - Hepatitis B contraindication to vaccine delivery
    - Preferred education method for education
    - Likert Scale Questions:
      - Current NICU performance
      - Concern for clinical setback & safety

**Results**

- **Survey**
  - Please indicate your profession: nurse, resident/fellow, APP, attending
  - For infants less than 2000g born to a Hepatitis B sAg negative mother, the initial hepatitis B vaccine should be administered at:
    - o Birth
    - o Process of life or before discharge (Correct)
    - o 36 weeks corrected and greater than 2000g
    - o Greater than or equal to 2000g
  - Which of the following are reasons to defer the initial hepatitis B vaccine administration:
    - o A) Patient on antibiotics
    - o B) Elevated apnea/bradycardia count
    - o C) Patient within 48 hours of discharge
    - o A and B
    - o All of the above (Correct)
  - None of the above
  - Does the initial Hepatitis B vaccine contribute to the overall immunization series (Yes/Correct/No):
    - Likert Scale (1=Strongly Agree to 5=Strongly Disagree)
    - o The first Hepatitis B vaccine for ELBW infants is administered on time (<1 month) for greater than 95% of patients in our NICU
    - o The first Hepatitis B vaccine is safe to administer to a patient on the ventilator
    - o I am concerned my patient will have unnecessary clinical setbacks if (she) receives the initial hepatitis B vaccine
    - What is your preferred method of receiving further information regarding the initial Hepatitis B vaccine in VLBW infants (select all that apply):
      - o Email, Presentations, Scrolling Information on Communication Board, Other

**Discussion**

- **Overall Timeliness**
  - A deficiency in timely delivery of hepatitis B vaccinations was identified (90 infants (64.29%) received vaccine, n=140)
    - o Low: 54.6% (04/2019 infants), High: 80% (09/2019)
  - PDSA 1
    - n=55 (39 nurses, 2 resident/fellows, 5 APP, 9 attendings)
    - Majority of respondents understand when vaccination should be given (81.8%).
    - Deficiency of knowledge exists of contraindications to immunizations, primarily amongst nursing
      - o 58.2% correctly identified no reason to defer (18 nurses, 1 R/F, 4 APP, 9 attendings)
      - o 34.6% (17 nurses, 1 R/F, 1 APP) incorrectly identified both apnea/bradycardia and antibiotics (answer d) as contraindications.
    - Staff agree the vaccine is safe to give to infants on the ventilator (76.9%) and disagree that vaccines cause clinical setbacks (76.9%)
    - Majority of staff believe our NICU administers vaccines to >90% of infants (56.1%)
      - Nursing (44.8%) were less likely to agree with this statement than attendings (87.5%), indicating various perceptions amongst profession.
    - Staff prefer email for communication (46/55 respondents)

**Conclusions & Next Steps**

- Hepatitis B vaccination delivery to VLBW infants in the NICU falls below our specific aim of 80%
- A deficiency in knowledge of actual NICU performance and contraindications to vaccine delivery was identified; however, staff do possess an adequate understanding of vaccine delivery time and a general belief that the vaccine is safe to deliver with limited clinical setbacks.
- Education could benefit staff as improper preconceptions regarding vaccinations and current performance could lead to hesitance when delivering vaccinations and poor overall vaccination delivery timeliness.
- Next steps:
  - Education to NICU staff regarding current performance and hepatitis B delivery and safety
  - Future PDSAs to alter the consent process and education to NICU staff and leadership

**Acknowledgements**

- Debbie Westbrook, Pharmacy
- NICU Staff and Leadership