Fellow Column: Diagnostic Precision in Neonatal Medicine: Why Over Investigate?

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Abbreviations:

CMV (cytomegalovirus), TORCH (Toxoplasmosis, others, rubella, C, Herpes), IUGR (intra

uterine growth restriction).

Introduction:

Neonatal patients are unique. They cannot express symptoms; however, a vigilant clinical examination may elicit signs that could be helpful in diagnosis. Due to an increased reliance on the investigation, the art of clinical medicine is disrupted. The disruption in skill acquisition and critical thinking is concerning. A medical student's journey from a clerkship to practice should be based on acquiring clinical skills and applying critical thinking. In the field of neonatology, it has been observed that the investigation is a rule rather than an exception. Here we present an example of a neonate who was over investigated for thrombocytopenia.

Case study:

A newborn male infant was admitted to the nursery with an initial platelet count of 73,000 K/uL. He was delivered via cesarean section at 38 weeks of gestation to a 34-year-old mother, gravida 4, Para 3103. The pregnancy was complicated by pregnancy-induced immune thrombocytopenia (ITP) for which she received a 10-day course of oral prednisolone. Her prenatal labs revealed a negative sickle cell screen, HIV, hepatitis B, and syphilis. She was rubella immune. Her blood group was O positive with negative antibodies. She had a past medical history of herpes simplex virus, treated with acyclovir. Upon delivery, the baby had a strong cry, he was dried, stimulated, and bulb suctioned. Apgar score was 8 and 9 at one and five minutes, respectively. His birth weight was 2375 grams (3.5%) and head circumference of 32.5 cm (16%). No signs of bleeding or bruises were noted. During rounds, a decision was made based on the clinical pathway to obtain an extensive workup to look for the reasons for low platelets. Although, this was a classic case of autoimmune thrombocytopenia, a TORCH titer, 3-daily urine CMV tests, and ultrasound of the head and abdomen were ordered. The natural resolution and course are depicted in Figure 1. What was the message given to the trainee?

"Due to an increased reliance on the investigation, the art of clinical medicine is disrupted. The disruption in skill acquisition and critical thinking is concerning. A medical student's journey from a clerkship to practice should be based on acquiring clinical skills and applying critical thinking. In the field of neonatology, it has been observed that the investigation is a rule rather than an exception."

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Figure

Figure1: Maternal and Infant platelet count (K/uL) over time

Discussion:

Instead of following an approach of good history taking, developing a list of differential diagnoses, narrowing it out to the most likely diagnosis, and then investigating, the infant had multiple tests. In hospital practice, to minimize variation among practitioners' clinical pathways are often used. This approach has shown to contain costs and decrease the length of stay while maintaining clinical outcomes. (1) The downside of developing these algorithms is taking away the critical thinking process among medical students and young practitioners.

The best clinical decision refers to making a choice that maximizes effectiveness and minimizes harm. (2) A practitioner who is doubtful will end up maximizing the investigations. If a provider's decision-making has built-in subjectivity and lack of evidence and skills, this may result in variation and unpredictability. (3) To minimize these problems, using a decision tree could be a potential solution. (4)

As noted in the case, there was no indication for obtaining TORCH titers and urine CMV PCR. The infant was borderline small for gestational age (BW 3.5 %) with a head circumference of 16%. Maternal serology was negative for syphilis, and she was rubella immune. An infant with TORCH infection presents with symmetrical IUGR. CMV could be asymptomatic at birth, but in this case,

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there was compelling evidence that TP was immune-mediated.

Now let us look at the multiple-choice question (MCQ) as an example (Appendix). All answers are correct, but with the knowledge and critical thinking, one can delineate to the best response. Similarly, the investigation should be tailored to the most likely diagnosis. A good history and clinical examination should eliminate the need for extensive investigation.

To conclude, as clinicians and medical educators, we should practice and teach our students the art of good history taking and to perform a complete physical examination. They should apply knowledge and critical thinking rather than jumping on extensive investigations. We should try to minimize the disruption in medical education and clinical practice.

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Appendix

A term newborn is noted to have a platelet count of 74 K/uL. Mother has a history of immune thrombocytopenia. The best next management step is:

- A) Obtain TORCH titer and urine CMV
- B) Obtain father's platelet antigen genotype
- C) Follow serial head ultrasound
- D) Follow serial platelet count
- E) Transfuse platelets for count < 50 K/uL

Correct Answer: D

In Practice: A, B, C, D, E (just in case, what if)

Early Neonatal thrombocytopenia (< 72 hours of life) could be due to intrauterine infection or immune-mediated. When the mother has ITP, the antibodies cross the placenta and destroy fetal platelet resulting in thrombocytopenia (TP). An infant born with a suspected infection should be checked for TORCH titer and urine CMV. However, isolated TP in the neonate is most likely immune-mediated. When maternal platelets are normal, alloimmune TP (NAIT) should be considered high in the list of differential diagnoses. When it comes to treatment, platelet transfusion is reserved for platelet count < 25 K/uL in well infants. Following serial head ultrasound is not logical. A screening HUS may be done, especially in NAIT. Decision pathways and management algorithms should be used as a guide; however, the investigation should not include all.

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