Current Best Evidence: Translating Best Evidence into Best Care

EDITOR'S NOTE: Studies for this issue were identified using alerts from *Archives of Disease in Childhood-Education and Practice, Archives of Disease in Childhood-Fetal and Neonatal, Archives of Disease in Childhood, British Medical Journal, Journal of the American Medical Association, New England Journal of Medicine, Pediatric Infectious Disease Journal, Pediatrics, The Journal of Pediatrics,* and *The Lancet*. Search terms were "paediatrics" [All Fields] OR "pediatrics" [All Fields] OR "pediatrics" [MeSH Terms]. In addition, studies were identified using the Clinical Queries feature of PubMed. Cleo Pappas, MLIS, retired, Library of the Health Sciences, University of Illinois at Chicago, contributed to the review and selection of this month's abstracts.

—Jordan Hupert, MD

EBM PEARL: RECURSIVE PARTITIONING (RP): RP is a statistically rigorous approach to algorithm development. In its simplest application, at each level of the RP algorithm, a larger group of poorly differentiated patients (with and without the target disease) are statistically partitioned into two groups of mostly affected and mostly unaffected patients. The statistical partition is based on a clinical question (eg, "Does the patient appear clinically well?"). This process is repeated at each subsequent level with other clinical questions. The RP program chooses, from a list of relevant clinical questions, those questions with the highest "purity" (ie, those with the greatest ability to partition patients into affected and unaffected groups). The RP algorithm created with one set of patients (derivation model) is then tested with another set of patients (validation model). Escobar et al (see piece by Young on page 640 regarding article Escobar et al, *Pediatrics* 2014;133:30-6) employed RP to partition newborns into three sepsis-probability groups (each with a unique, recommended management) based on maternal factors and neonatal clinical presentation.

—Jordan Hupert, MD

LITERATURE SEARCH PEARL: GOOGLE SCHOLAR (GS): GS is a freely available searching platform designed to retrieve scholarly literature (published and unpublished articles, theses, books, abstracts, and legal documents) among all fields of endeavor, including biomedical research. One may search GS using standard Boolean search terms (AND, OR, NOT), though few filters are permitted other than date of publication (in contrast to PubMed). The GS search algorithm retrieves articles based largely on citation counts. Typically, GS retrieves more articles and more free full-length articles compared with PubMed—though retrieval relevance (to the search topic) is variable (*J Med Internet Res* 2013;15:e164). On the other hand, compared with GS, the Clinical Queries feature of PubMed retrieved a higher percentage of methodologically high-quality articles (*Respir Care* 2010;55:578-83). GS may be a nice option for a quick, initial answer to a clinical question.

—Jordan Hupert, MD

A data-based approach to evaluation and empiric treatment of newborn sepsis

Escobar GJ, Puopolo KM, Wi S, Turk BJ, Kuzniewicz MW, Walsh EM, et al. Stratification of risk of early-onset sepsis in newborns ≥ 34 weeks' gestation. *Pediatrics*. 2014;133:30-6.

Question Among newborns with maternal and neonatal-specific risk factors for sepsis, what is the diagnostic accuracy of risk-factor stratification, compared with blood culture, in detecting sepsis?

Design Derivation and validation retrospective datasets from randomly selected controls and all blood-culture-positive newborns 1993-2007. Patient-group stratification was based on recursive partitioning.

Setting Kaiser Permanente Northern California hospitals and Boston's Brigham and Women's Hospital and Beth Israel-Deaconess Medical Center.

Participants Newborns ≥34 weeks' gestation.

Outcomes Stratified sepsis-risk probabilities (posttest) based on maternal (pretest) and newborn clinical (test) risk factors.

Main Results Using maternal and neonatal data, a risk stratification scheme divided the neonatal population into three groups: treat empirically (4.1% of all live births, 60.8% of all cases of early-onset sepsis, sepsis incidence of 8.4/1000 live births), observe and evaluate (11.1% of births, 23.4% of cases, sepsis incidence 1.2/1000), and continued observation (84.8% of births, 15.7% of cases, sepsis incidence 0.11/1000).

Conclusions Judicious application of this stratified scheme could result in decreased antibiotic treatment in 80 000 to 240 000 US newborns each year.

Commentary When labor is complicated by maternal factors such as chorioamnionitis or inadequate intrapartum antibiotic prophylaxis, even well-appearing newborns typically undergo laboratory tests and receive antibiotics based on recommendations of the Centers for Disease Control and Prevention and

the American Academy of Pediatrics. Escobar et al propose a stratification scheme dividing newborns into those who should be treated empirically, those who should be observed and evaluated, and those who need only be observed. The scheme is based on a combination of the authors' previously published early-onset-sepsis risk assessment tool[1] and a "Classification of Clinical Signs" described in the current publication. The authors used recursive partitioning of 5 maternal and 3 newborn factors from a case control study that compared 350 newborns with culture positive sepsis (cases) with 1063 controls from a population of 608,014 live births to generate a stratification model that is appealing because it is both intuitive and simple to understand. Its use could substantially reduce the number of newborns tested and treated.

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Reference

1. Puopolo KM, Draper D, Wi S, Newman TB, Zupancic J, Lieberman E, et al. Estimating the probability of neonatal early onset infection on the basis of maternal risk factors. Pediatrics 2011;128:e1155-63.

Swaddling may cause death and injury

McDonnell E, Moon RY. Infant Deaths and Injuries Associated with Wearable Blankets, Swaddle Wraps, and Swaddling. *J Pediatr*. 2014;164:1152-6.

Question Among young infants, what are the details of swaddling leading to death and injury?

Design Retrospective review of incidents reported to the Consumer Product Safety Commission.

Setting United States, 2004-2012.

Participants Swaddled infants.

Outcomes Death and injury incidents.

Main Results There was a total of 36 incidents involving wearable blankets and swaddle wraps, including 22 deaths, 2 injuries, and 12 incidents without injury. The median age at death was 3.5 months; 80% of the deaths were attributed to positional asphyxia related to prone sleeping, and 70% involved additional risk factors, usually soft bedding. Two injuries involved tooth extraction from the zipper. The 12 incidents without injury reported concern for strangulation/suffocation when the swaddle wrap became wrapped around the face and neck, and a potential choking hazard when the zipper detached. All 12 incidents involving swaddling in ordinary blankets resulted in death. The median age at death was 2 months. Fifty-eight percent of deaths were attributed to positional asphyxia related to prone sleeping, and 92% involved additional risk factors, most commonly soft bedding.

Conclusions Reports of sudden unexpected death in swaddled infants are rare. Risks can be reduced by placing infants supine, discontinuing swaddling as soon as an infant's earliest attempts to roll are observed, and removing soft bedding and bumper pads from the sleep environment.

Commentary Parents often complain that their babies do not sleep well when placed on their backs as recommended. This has led to an exponential increase in products such as infant sleeping bags or wearable blankets, numerous swaddle wraps and swaddling blankets. These are designed to restrict spontaneous limb movements with the aim of preventing infants from waking themselves, thus increasing sleep time.[1] The study by McDonnell and Moon highlights that these products are not always safe. Eighty-six percent of the 22 deaths were attributed to asphyxia with 68% of these infants found prone, either rolling to or being placed in this position. As these products and swaddling restrict limb movements, they severely reduce the infant's ability to roll from back to front or to turn away from suffocating bedding. In 12 cases, swaddle wraps had come loose and covered the infants' faces. These devices need to be used with caution. Advice to parents needs to be very clear. Infants should be put to sleep supine on a firm surface with no soft or loose bedding. Swaddling should be used only in infants under 3 months of age who cannot yet roll.

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Reference

1. van Sleuwen BE, Engelberts AC, Boere-Boonekamp MM, Kuis W, Schulpen TW, L'Hoir MP. Swaddling: a systematic review. Pediatrics 2007;120:e1097-106.

Antibiotic treatment in otitis media reduces middle ear effusion duration

Tapiainen T, Kujala T, Renko M, Koivunen P, Kontiokari T, Kristo A, et al. Effect of Antimicrobial Treatment of Acute Otitis Media on the Daily Disappearance of Middle Ear Effusion: A Placebo-Controlled Trial. *JAMA Pediatr*. 2014;165:635-41.

Question Among children with otitis media (OM), what is the therapeutic efficacy of antibiotics, compared with placebo, in resolution of middle ear effusion (MEE)?

Design Randomized controlled trial.

Setting Outpatient clinics, Oulu, Finland.

Participants Children, 6 months to 15 years old.

Outcomes Time to disappearance of MEE.

Main Results On day 14, 69% of children in the antimicrobial group and 38% in the placebo group had normal tympanometry findings (number needed to treat [NNT] 4; 95% CI, 2-11). On day 60, 2 children (5%) in the antimicrobial group and 10 children (24%) in the placebo group had persistent MEE (NNT 6; 95% CI, 3-22).