

Clinician Gestalt in Managing Pediatric Pneumonia: Can We Predict the Future?

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*It's tough to make predictions,
especially about the future.*

Yogi Berra

In this issue of *Pediatrics*, Gao et al¹ examine the value of clinical gestalt in predicting the progression to severe disease in children presenting to an urban pediatric emergency department with suspected community acquired pneumonia (CAP). CAP is one of the most common serious infections of childhood, accounting for ~2 million annual ambulatory visits and 124 000 annual hospitalizations in the United States alone.²⁻⁵ Globally, childhood pneumonia accounts for significant morbidity and mortality, particularly in low- and middle-income countries.⁶ Complications of CAP include pleural effusions, empyema, sepsis, and others that may require additional procedures, ICU stays, and prolonged antibiotic courses. The management of CAP relies on appropriate diagnosis as well as thoughtful risk stratification to inform decisions, such as antimicrobial choice, patient disposition, and follow-up timing. Clinicians are often required to make these types of diagnoses and initial management decisions on the basis of brief encounters with patients. The impressions made on these visits often rely on a heuristic (ie, shortcut) approach to diagnosis and management. Much of medical decision-making relies on pattern recognition, which can include gestalt, gut feeling, or intuition.⁷

In this prospective cohort study, pediatric emergency medicine

physicians were asked to estimate the probability that patients with suspected pneumonia (based on initial patient encounter and chest radiograph findings) will develop a complicated and/or severe pneumonia.¹ The authors found that clinician gestalt was most sensitive (>90%) when the estimate for a complicated pneumonia was low and most specific (>90%) when the probability for complications to develop was judged to be high. Clinician gestalt was poorly predictive in situations of greater uncertainty (the intermediate range of risk on the probability spectrum), indicating that gestalt alone is not enough to predict disease and that, importantly, clinicians tended to underestimate CAP severity. In general, clinician gestalt alone was insufficient to reliably discriminate which child was at risk for developing a complicated pneumonia, with an area under the curve of 0.747.

The definition of clinical gestalt has some variability and at times is used interchangeably with the term “gut feeling” or intuition. Here we will refer to the general concept of clinical gestalt as a physician’s implicit assessment as applied to diagnosis, the need for further evaluation, and prognosis. Indeed, published studies of clinicians’ ability to predict the future seem to fall into 3 categories: (1) predicting the presence or absence of disease, such as sepsis or serious bacterial infection⁸⁻¹²; (2) anticipating the need for further diagnostic workup to rule out a disease or injury, such as appendicitis,

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pulmonary embolism, or extremity fracture^{7,13,14}; and (3) estimating the risk of disease progression (as exemplified in the study by Gao et al¹).

Dual process theory, the process of implicit or explicit thought generation, has been applied to clinical diagnostic reasoning, and 2 systems of thinking have been proposed: analytic (or “slow thinking”) and nonanalytic (or “fast thinking”). These 2 systems of thinking together result in a clinician’s assessment of a patient’s diagnosis.¹⁵ Nonanalytic thinking is typically thought of as incorporating pattern recognition, thereby creating a gestalt of the patient’s condition. The clinician’s gestalt of a patient’s condition is typically enhanced by experience and a knowledge base. Gao et al¹ found that experienced clinicians were better able to predict the development of a complicated or severe pneumonia than their less-experienced colleagues, with an area under the curve of 0.747 vs 0.693, respectively. In another study, clinician gestalt used to estimate the pretest probability of pulmonary embolism improved with experience.⁷ To overcome the experience advantage, clinical prediction rules were developed to approximate clinician gestalt; the Pulmonary Embolism Rule-out Criteria (commonly referred to as PERC), is a quantified measure of experienced clinical assessment.¹⁶

Beyond clinician gestalt, it has been suggested that intuition or gut feelings exist at the extremes of nonanalytic medical decision-making. Gut feeling is a mode of cognition that involves rapid unconscious processing and has been proposed as being slightly different from gestalt.¹⁷ Clinician intuition, or gut feeling, has been studied in primary care settings. The gut feeling is immediate and combines previous knowledge gained by the relationship with the patient or family with the primary care

provider’s knowledge and experience and results in an immediate concern requiring immediate action or reassurance.¹⁷ In a pediatric primary care setting, a gut feeling of concern based on both the clinician and parent’s concern for serious illness has been demonstrated to be associated with subsequent development of severe infection.¹⁰ Another study revealed that a general practitioner’s sense of alarm for patients with dyspnea was associated with a twofold increase in posttest likelihood of a life-threatening disease.¹⁸

The concept of clinical gestalt goes beyond the binary positive (heightened concern) or negative (reassured) determination of a patient’s current state or trajectory of illness. Instead, clinical gestalt is a more generalized physician intuition of a patient’s condition, based on signs and symptoms, knowledge of epidemiology, and estimated pretest probability that is used to predict the diagnosis, the need for escalation of care, and the overall trajectory of disease. Gestalt seems to be most accurate in predicting a patient’s diagnosis or prognosis at the extremes of probability, particularly in negative predictive value, as seen in predicting likelihood of fracture in minor trauma,¹⁴ pulmonary embolism,^{7,19} and pediatric appendicitis.¹³ This pattern is also reflected in the findings by Gao et al.¹

Although clinical gestalt has value, it is important to keep in mind that it is also prone to error and biases and is not sufficient to guide medical decision-making and should be combined with evidence-based decision-making tools when possible.^{20,21} One study of physician ability to predict positive blood culture results revealed poor ability to predict bacterial sepsis even 1 day before; however, clinicians were able to reasonably discriminate sepsis by positive blood culture result on the

day of antibiotic initiation for potential sepsis.⁹ Other studies in which a scoring system based on aspects of clinical assessment is used to predict the presence of invasive bacterial infection in febrile infants have revealed poor performance.^{11,12,22}

The performance and value of clinician gestalt in management decisions will likely be affected by external factors, such as the environment and time pressures of a busy urban emergency department setting as compared with an ambulatory care setting. One of the limitations of the Gao et al¹ study, as the authors point out, was the low number of patients who developed severe complications, potentially making it difficult to find an association. In the future, it would be interesting to explore how clinician gestalt is impacted by immediate contextual factors (including practice setting and type, work environment, and tools and technologies used), patient factors (such as language proficiency and parental concern), and societal factors, such as racial bias. Increasingly, there is recognition that racial bias affects other subjective clinical assessments, such as pain severity.^{23,24} It would be important to examine the effect of these biases on gestalt accuracy as well.

The authors should be commended for their study of gestalt and clinical reasoning. They remind us to be cognizant of how we arrive at a working diagnosis and predict the course of illness. Additionally, by demonstrating the limitations of gestalt, they highlight the potential to augment gestalt (and lack of experience) with evidence-based decision rules. Thus, to predict the future, there is value in systematically coordinating nonanalytic (gestalt, intuition, gut feeling) and analytic (evidence-based) reasoning to improve medical decision-making.

ABBREVIATION

CAP: community acquired pneumonia

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