BENDING THE VALUE CURVE

Promoting High-Value Care During Hospitalist and Intensivist Comanagement in the Care of the Deteriorating Child With Bronchiolitis

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A previously healthy 10-month-old girl is admitted to the medical ward with bronchiolitis. Her emergency department examination revealed moderate to severe retractions with temperature 100.5°F (38.06°C), heart rate 156 beats per minute, respiratory rate 58 breaths per minute, and SpO_2 83%. Her vital signs normalized and distress improved after deep suctioning and high-flow oxygen (humidified high-flow nasal cannula [HHFNC]) initiation. No additional interventions are ordered after admission.

Twelve hours later, the team notes progressing distress despite continuation of HHFNC. They administer a fluid bolus, but the patient remains in distress. The senior resident requests a "rapid response team (RRT) panel" consisting of a chest radiograph and albuterol. They then activate the RRT. The responding intensivist recommends they suction aggressively and initiate continuous positive airway pressure while awaiting transfer to the ICU.

Many children's hospitals use rapid response systems for early intervention on deteriorating patients.[1] Use of RRTs, a common component of these systems that calls an intensivist to the bedside of a deteriorating patient, is associated with improved hospital mortality,[2] decreased cardiopulmonary arrests,[2] and slowed incidence of critical deterioration events.[3] Yet providers report barriers to escalating care including anticipation of disagreement with the RRT's recommendations.[4] These disagreements involve both management recommendations and appropriate disposition, suggesting differing definitions of value among the care team.

Defining high-value care (using the right resources for the right patient at the right time[5,6]) can be difficult during care escalation because the balance of health outcomes and cost[7] is dependent on difficult assessments of severity of illness and illness trajectory. Although a primary benefit of RRTs is the addition of critical care assistance with these assessments, it also places children in a tug-of-war between 2 perspectives on value born from different experiences. The RRT disposition determines if the child remains in the realm of the hospitalist or transitions to that of the intensivist. Standard practice in 1 unit may be viewed as low-value care in the other.

Years ago, residents at our institution referred to an RRT panel ordered for children with escalating bronchiolitis. They felt ICU transfer could be expedited if a chest radiograph and albuterol were ordered before RRT activation. This assumption was born from perceived differences in opinion about the optimal care of bronchiolitis between

www.hospitalpediatrics.org
DOI:https://doi.org/10.1542/hpeds.2017-0225

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HOSPITAL PEDIATRICS (ISSN Numbers: Print, 2154-1663; Online, 2154-1671).

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

Dr Lockwood drafted the initial manuscript and edited subsequent versions; Dr Robison edited the manuscript; Dr Carpenter edited the manuscript and provided mentorship; Dr Reese edited the manuscript and provided mentorship; and all authors approved the final manuscript as submitted.

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the hospitalist team and the RRT. Rather than view these differences as an opportunity for collaboration and learning, however, the resident teams occasionally used them as opportunities to game the system. Phenomena like this led some providers to begrudge RRT activations and the perceived low-value recommendations associated with them.

BREAKING DOWN DIFFERENT PERSPECTIVES USING ARITHMETIC

Among children with bronchiolitis, those with severe illness are the denominator within which intensivists work. But, to hospitalists, these high-acuity patients are a small numerator pulled from the broader population of hospitalized children. For hospitalists, 97% of patients with bronchiolitis never require transfer to the ICU[8,9] and <1% ever require intubation.[9] Conversely, intensivists see only the sickest patients in their ICU, of which 73% require HHFNC[10] and 11% to 14% require intubation.[9,10] Children requiring RRT activation are threatening to cross from the hospitalists' numerator into the intensivists' denominator. Although researchers have identified risk factors for deterioration in bronchiolitis,[11] we cannot know for certain which children will cross over.

DEFINING VALUE WITHOUT EVIDENCE

The American Academy of Pediatrics' clinical practice guideline (CPG) for routine bronchiolitis is clear[12]: suction, support, hydrate… and wait. But how do you define "routine," and what do you do for atypical cases if evidence is lacking? Although providing high-value care may mean "safely doing less" to hospitalists,[13,14] to intensivists it may mean more aggressive intervention to prevent the morbidity (and mortality) seen previously in severe illness. An intensivist's experience may suggest interventions halt deterioration, whereas a hospitalist's may suggest patients recover without them. Intensivists may see illness severity as a sign of an undiagnosed comorbidity or complication justifying further diagnostics, whereas hospitalists may tolerate a broader definition of bronchiolitis. An equivocal consolidation on a chest radiograph may be interpreted differently depending on the clinical situation and environment. It is logical, then, that providers are more likely to order antibiotics on patients with more severe illness.[15] Providers surrounded by severe illness may feel CPGs are too restrictive when patients become critically ill, whereas those who see primarily routine illness may feel recommendations should be upheld after ICU transfer.

Although the CPG recommends limited supportive care for routine bronchiolitis,[12] alternative interventions are often ordered for patients with severe illness.[16] Although more invasive management of severe bronchiolitis may not improve outcomes,[17] there remains significant variation in care between medical centers, hospital units, and individual providers.[15,18–21] Table 1 shows the CPG language for common interventions as it applies to severe illness. It does not list severe illness in the formal exclusion criteria; however, it does mention illness severity as a consideration within many recommendations because of the paucity of studies within this population. As such, only clinical judgment can decide whether the recommendations apply to patients with severe illness. Individual providers may feel strongly in either direction, making it difficult to uniformly define value when escalating care. Neither higher-acuity children on the wards nor lower-acuity children in ICUs are failures so long as providers practice within their abilities and make patient-centered decisions together.

MAINTAINING VALUE DURING CARE ESCALATION

Hospitalists have applied the CPG to many children with routine bronchiolitis who are then safely discharged from the hospital, and intensivists have applied empirical interventions that may have prevented further deterioration within a critically ill population. Although recommendations are not always congruent when a child's illness severity straddles the 2 realms, both perspectives have value. The incongruence is a strength of RRTs because the deteriorating child benefits from the collective wisdom of a team with diverse experiences. Value is lost, however, when those differing perspectives lose their patient centeredness through attempts to game the system, as was the case with RRT panels at our institution.

Fortunately, RRT panels have largely disappeared in recent years because of continued evaluation and improvement efforts. We qualitatively studied providers' perceptions of culture and barriers to escalating care and used that information to inform focused education.[22] We learned

TABLE 1 Excerpts Addressing Illness Severity Within Recommendations from the American Academy of Pediatrics' Clinical Practice Guideline for Routine Bronchiolitis

Recommendation	Intervention or Test	Quote Related to Severe Illness	Page
1c	Chest radiograph	"Initial radiography should be reserved for cases… severe enough to warrant ICU admission…"	e1479
2	Albuterol	"Children with severe disease or…respiratory failure were generally excluded…and this evidence cannot be generalized to these situations"	e1481
3	Racemic epinephrine	"This evidence suggests epinephrine should not be used in children hospitalized for bronchiolitis, except potentially as a rescue agent in severe disease…"	e1481
4b	Hypertonic saline	"It has not been studied in intensive care settings, and most trials have included only patients with mild to moderate disease"	e1483
8	Antibiotics	"…it may be difficult to distinguish between atelectasis and bacterial infiltrate or consolidation…Antibiotic therapy may be justified in some children with bronchiolitis who require intubation and mechanical ventilation for respiratory failure"	e1486

that the development and sustainment of any rapid response system must address the institutional culture surrounding escalation. The time for such cultural preparation is not in the tense minutes-to-hours leading to an escalation event but rather in the months-to-years before the child presents. The first discussion of the care for escalating children does not have to happen at the bedside of a deteriorating patient.

This preparation includes training simulations of high-stress scenarios such as Code Blue activations; protocolized escalation processes and scripts for clear, direct communication; and tools to empower care team members to escalate up the chain of command. Additionally, providers from all units, including hospital medicine and critical care, should be involved in the creation of disease-specific care pathways to promote buy-in to a shared, hospital-wide vision across all illness severities. Having varied perspectives at RRTs is 1 of their primary strengths, but providers must be prepared to collaborate.

CONCLUSIONS

This patient was transferred to the ICU with acute respiratory failure secondary to severe bronchiolitis. She received continuous positive airway pressure for 24 hours before weaning to room air on hospital day 4. Ordering albuterol for this patient with severe bronchiolitis was not necessarily wrong because evidence is lacking in this population and experience may suggest the slowing of deterioration associated with reversible bronchoconstriction may outweigh possible adverse effects such as tachycardia and increased metabolic demands.[23] However, the order would be low value if the intent was not patient-centered but rather an attempt to presumptively complete steps the hospitalist team feels the RRT may "require" before ICU transfer to expedite the disposition.

Although this discussion has been focused on severe bronchiolitis, the concepts are applicable to many clinical scenarios. Acute respiratory illnesses, fever of unknown origin, and altered mental status each represents a case in which evidence may be lacking or unclear, and care may differ based on the patient's location. The debate shown here (hospitalists say "don't do this," whereas intensivists say "do") is a recurring theme at many institutions when illness severity is escalating. Every patient and provider is unique, and, as illness severity worsens and the RRT is called, communication applying both existing evidence and experiences from all sides may save the child's life.

The RRT panel largely went away at our institution because of improvement efforts to reduce variation in care and promote collaboration across units. By understanding our colleague's perspectives on both sides of the equation, we can avoid tribalism, the "us versus them" mentality experienced by providers of different specialties.[24] Patients' acuities sometimes straddle hospitalist and intensivist realms, and that is okay. Both groups have something to gain from the other, and the patient has much to gain from both. With collaboration at RRTs and motivations focused squarely on the patient, high-value patient care can be maintained.

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Hospital Pediatrics 2018;8;368
DOI: 10.1542/hpeds.2017-0225 originally published online May 10, 2018;

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DOI: 10.1542/hpeds.2017-0225 originally published online May 10, 2018;