RESEARCH ARTICLE

Characteristics of Children Hospitalized With Aspiration Pneumonia

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ABSTRACT

OBJECTIVES: Unlike community-acquired pneumonia (CAP), there is a paucity of data characterizing the patient demographics and hospitalization characteristics of children with aspiration pneumonia. We used a large national database of US children's hospitals to assess the patient and hospitalization characteristics associated with aspiration pneumonia and compared these characteristics to patients with CAP.

METHODS: We identified children hospitalized with a diagnosis of aspiration pneumonia or CAP at 47 hospitals included in the Pediatric Health Information System between 2009 and 2014. We evaluated whether differences exist in patient characteristics (median age and proportion of patients with a complex chronic condition), and hospital characteristics (length of stay, ICU admission, cost, and 30-day readmission rate) between children with aspiration pneumonia and CAP. Lastly, we assessed whether seasonal variability exists within these 2 conditions.

RESULTS: Over the 6-year study period, there were 12 097 children hospitalized with aspiration pneumonia, and 121 489 with CAP. Compared with children with CAP, children with aspiration pneumonia were slightly younger and more likely to have an associated complex chronic condition. Those with aspiration pneumonia had longer hospitalizations, higher rates of ICU admission, and higher 30-day readmission rates. Additionally, the median cost for hospitalization was 2.4 times higher for children with aspiration pneumonia than for children with CAP. More seasonal variation was observed for CAP compared with aspiration pneumonia hospitalizations.

CONCLUSIONS: Aspiration pneumonia preferentially affects children with medical complexity and, as such, accounts for longer and more costly hospitalizations and higher rates of ICU admission and readmission rates.

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Aspiration pneumonia is an important cause of serious morbidity and mortality, particularly among children with chronic medical conditions.[1–3] Conditions that increase the volume of aspirated oropharyngeal contents lead to an increased risk of aspiration pneumonia.[3] Although half of all healthy adults aspirate small amounts of oropharyngeal secretions during sleep, a number of protective mechanisms, including ciliary clearance and cough, are protective against aspiration pneumonia in healthy individuals.[4] These protective mechanisms are disrupted in a number of conditions, including swallowing dysfunction, in which the risk of aspiration pneumonia is nearly 7 times higher when present after stroke.[5]

Children with technology dependence are at particularly high risk of developing aspiration pneumonia and have a disproportionately high rate of hospitalizations and resource utilization.[6] A recent study limited to children with neurologic impairment observed that children hospitalized with aspiration pneumonia had higher complication rates, length of stay, and costs than children with community-acquired pneumonia (CAP).[7] Although CAP has been described in depth in pediatric populations,[8,9] there is a paucity of data characterizing the patient demographics and hospital characteristics of children hospitalized with aspiration pneumonia. Also, it is unclear whether differences exist between aspiration pneumonia and CAP with respect to the course, treatment, and outcomes among hospitalized children.

To address these gaps in knowledge, we used a large national database of US children's hospitals to provide a descriptive overview of aspiration pneumonia in hospitalized children and to compare patient and hospitalization characteristics of children with aspiration pneumonia to children with CAP.

METHODS

We conducted a retrospective cohort study using data obtained from the Pediatric Health Information System (PHIS),[10] an administrative database that contains inpatient, emergency department, ambulatory surgery, and observation encounter-level data from more than 47 not-for-profit, tertiary care pediatric hospitals in the United States. Participating hospitals are located in noncompeting markets of 27 states plus the District of Columbia and account for ~15% of all pediatric hospitalizations in the United States. These hospitals are affiliated with the Children's Hospital Association (Overland Park, KS). Data quality and reliability are ensured through a joint effort between the Children's Hospital Association and participating hospitals. Portions of the data submission and data quality processes for the PHIS database are managed by Truven Health Analytics (Ann Arbor, MI). For the purposes of external benchmarking, participating hospitals provide discharge/encounter data including demographics, diagnoses, and procedures. Nearly all of these hospitals also submit resource utilization data (eg, pharmaceuticals, imaging, and laboratory) into PHIS. Data are deidentified at the time of data submission and are subjected to a number of reliability and validity checks before being included in the database. For this study, data from 47 hospitals were included.

Children discharged from either the inpatient or observation unit with a diagnosis of either aspiration pneumonia or CAP at 1 of the 47 PHIS participating children's hospitals between January 1, 2009, and December 31, 2014, were included. A patient was considered to have aspiration pneumonia if he or she had 1 of the following diagnosis codes: 507.0 [aspiration pneumonia], 507.1 [pneumonitis due to inhalation of oils and essences], and 507.8 [pneumonitis due to other solids and liquids]. We defined CAP using a previously validated set of *International Classification of Diseases, Ninth Revision* (ICD-9) diagnosis codes: 481–483.8, 485–486.[11] We excluded children with cystic fibrosis (277.00–277.09) in whom the diagnosis of pneumonia can be difficult to distinguish from an exacerbation of their underlying disease. Additionally, after comparing mortality rates between children with aspiration pneumonia and CAP, we excluded children who died during their hospitalization.

To evaluate differences in disease entities (aspiration pneumonia vs CAP), we examined patient and hospitalization characteristics, resource utilization, testing, and treatments received by patients in each group. Demographic characteristics analyzed included age (0–30 days, 31–365 days, 1–4 years, 5–12 years, 13–18 years, or >18 years), sex, race/ethnicity (Latino, not Latino, white, black, Asian, or other), and insurance type (percentage of children with government insurance).

The proportion of patients with complex chronic conditions (CCCs) was also assessed among children with aspiration pneumonia and CAP. CCCs comprise a set of ICD-9 diagnosis and procedure codes for each category assignment.[12] These category assignments include diagnoses that (1) are expected to last >12 months and (2) involve either several organ systems or 1 organ system severely enough to require specialty care and hospitalization. The proportion of patients with chronic conditions was also characterized based on the organ system(s) involved. Furthermore, we assessed for the presence of technology dependence, which was defined as medical technology used to maintain a child's health status, such as a gastrostomy, tracheostomy, cerebrospinal fluid ventricular shunt, permanent indwelling catheter, and pacemaker.[13–16]

Patients were further characterized based on the duration of hospitalization (1–2 days, 3–7 days, or >7 days) and whether they received ICU care or had a readmission within 30 days of hospital discharge. Additionally, patients were classified based on whether they had an ICD-9 diagnosis code for complicated pneumonia and whether they underwent a pleural drainage procedure. Complicated pneumonia was defined by the presence of empyema (510.0 and 510.9), pleurisy (511.0 and 511.1), pleural effusion (511.9), or abscess of lung (513.0), and pleural drainage was defined by ICD-9 procedure codes for thoracentesis (34.91), chest tube placement (34.04), video-assisted thoracoscopic surgery (34.21), and thoracotomy (34.02 and 34.09). Lastly, the rate of laboratory testing was compared between children with aspiration pneumonia and CAP.

Median hospitalization costs were also compared between children with aspiration pneumonia and CAP. The total patient costs were based upon the Ratio of Cost to Charges submitted by the hospitals on their respective Medicare cost reports. Charges were adjusted by the CMS wage/price index for the hospital's location and adjusted for inflation to 2014 dollars using the annual Consumer Price Index inflation rate for the "Hospital and related services" expenditure category.[17] Illness severity was measured using the severity scale defined as part of the All Patient Refined Diagnosis Related Groups classification (minor, moderate, major, or extreme).[18] For the purposes of statistical comparison between aspiration pneumonia and CAP groups, we compared patients designated as extreme versus all others.

We also evaluated whether antibiotic prescribing patterns differed between children with aspiration pneumonia and CAP. Antibiotic groupings were based on commonly used empirical regimens for aspiration pneumonia and CAP as described in both Infectious Diseases Society of America guidelines[19,20] and in previous studies.[8,21] Antibiotics were categorized into the following groups: penicillin and ampicillin, cephalosporins, macrolides, vancomycin, clindamycin, ampicillin/sulbactam, piperacillin/tazobactam, meropenem, and fluoroquinolones. Additionally, the most frequent antibiotic combinations were derived and compared between children with aspiration pneumonia and CAP. Lastly, we assessed whether the use of corticosteroids differed between children hospitalized with aspiration pneumonia and CAP.

Statistical Analyses

Patient demographic characteristics and prevalence of CCCs are described using percentages or median (interquartile range) for categorical and continuous variables, respectively. Characteristics of aspiration pneumonia and CAP were compared using χ^2 testing for categorical variables and Wilcoxon rank sum testing for continuous variables. We also performed analyses limited to the subpopulation of children without a CCC. Any characteristic that was associated with pneumonia type at the $P < .10$ level was considered a potential confounder in subsequent multivariable models of clinical outcomes.

Hospitalization characteristics (ie, length of stay, classification of pneumonia, laboratory testing, 30-day readmission, and cost) and pharmacological treatment (ie, antibiotics and corticosteroid administration) were compared between patients with aspiration pneumonia and CAP. We estimated a series of generalized linear models with the hospitalization and treatment outcomes as the dependent variable and pneumonia type (aspiration vs CAP) and any demographic variables flagged as potential confounders as the independent variables. For binary outcomes, we used the binomial family and logit link. For continuous outcomes, we used

TABLE 1 Demographic Characteristics of the Children With Aspiration and CAP at 47 Pediatric Hospitals From January 1, 2009 Through December 31, 2014

Patient Characteristic on Index Visit	Aspiration Pneumonia, $n = 12\,097$, n (%)	CAP, $n = 121\,489$, n (%)	P
Age			<.001
0–30 d	30 (0.3)	562 (0.5)	
31–365 d	2299 (19.0)	16 143 (13.3)	
1–4 y	4235 (35.0)	51 509 (42.4)	
5–12 y	3098 (25.6)	36 884 (30.4)	
13–18 y	1766 (14.6)	12 819 (10.6)	
>18 y	669 (5.5)	3572 (2.9)	
Female	5384 (44.5)	57 158 (47.1)	<.001
Ethnicity			.199
Latino	2893 (23.9)	28 732 (23.7)	
Not Latino	7480 (61.8)	76 037 (62.6)	
Unknown	1724 (14.3)	16 720 (13.8)	
Race			<.001
White	6739 (55.7)	67 725 (55.8)	
Black	1871 (15.5)	22 884 (18.8)	
Asian	324 (2.7)	3281 (2.7)	
Other	2515 (20.8)	20 732 (17.1)	
Missing	648 (5.4)	6867 (5.7)	
Primary payment source			<.001
Private	3443 (28.5)	41 804 (34.4)	
Public	8037 (66.4)	72 016 (59.3)	
Other	385 (3.2)	4587 (3.8)	
Missing	232 (1.9)	3082 (2.5)	

TABLE 2 Comorbidities for Children With Aspiration and CAP at 47 Pediatric Hospitals From January 1, 2009 Through December 31, 2014

Patient Characteristic on Index Visit	Aspiration Pneumonia, $n = 12\,097$, n (%)	CAP, $n = 121\,489$, n (%)	P
Any CCC (%)	10 590 (87.5)	43 747 (36.0)	<.001
1 CCC	1532 (12.7)	19 199 (15.8)	
2 CCC	1509 (12.5)	6707 (5.5)	
≥3 CCC	7549 (62.4)	17 841 (14.7)	
Type of CCC[a]			
Cardiovascular	1821 (15.1)	8086 (6.7)	<.001
Gastrointestinal	7400 (61.2)	16 338 (13.5)	<.001
Hematologic/immunologic	420 (3.5)	5318 (4.4)	<.001
Malignancy	278 (2.3)	2665 (2.2)	.455
Metabolic	1005 (8.3)	3373 (2.8)	<.001
Neurologic/neuromuscular	6626 (54.8)	12 201 (10.0)	<.001
Congenital	3951 (32.7)	11 359 (9.4)	<.001
Renal/urologic	619 (5.1)	2634 (2.2)	<.001
Respiratory	2428 (20.0)	15 131 (12.5)	<.001
Premature/neonatal	1051 (8.7)	3254 (2.7)	<.001
Technology dependent	7957 (65.8)	18 576 (15.3)	<.001
Transplant	104 (0.9)	2013 (1.7)	<.001

[a] Not mutually exclusive.

the γ family and log link. Given that our data were taken from several hospitals, the assumption of independent observations may not hold. To accommodate these data, our regression model used clustered sandwich standard error estimates, which allow for intrahospital correlation, relaxing the assumption that observations from the same hospital are independent.

We also compared the seasonality effect between the pneumonia groups. First, we estimated a Poisson regression model with aspiration pneumonia cases as the dependent variables and a seasonality indicator variable (January–April,[22,23] inclusive, vs all other months) as the independent variable, adjusting for calendar year and using the log of the total hospitalized population as the offset (coefficient constrained to 1). We estimated an identical model with CAP as the outcome. We then compared the seasonal effect between the groups by testing the null hypothesis that the interseasonal δ in the CAP group is equal to the interseasonal δ in the aspiration group (ie, the estimated seasonality coefficient from the first model is equal to that of the second). All tests were 2-tailed and P values $<.05$ were considered statistically significant for all analyses.

This study was approved by the institutional review board at Boston Children's Hospital.

RESULTS

Mortality was more likely among children with aspiration pneumonia ($n = 198$, 1.6%) compared with children with CAP ($n = 425$, 0.4%; $P < .001$). After excluding children with cystic fibrosis ($n = 7723$) and children who died during the course of a hospitalization ($n = 623$), there were 133 586 children included over the 6-year study period: 12 097 with aspiration pneumonia and 121 489 with CAP. The majority of children with aspiration pneumonia had an ICD-9 diagnosis of aspiration pneumonia (507.0; $n = 11\,925$), and 172 had a diagnosis of pneumonitis due to other solids and liquids (507.8). Children with aspiration pneumonia were older (median age [interquartile range] 4 [1–11] vs 4 [1–8]; $P < .001$) and more likely to have public insurance than children with CAP (66% vs 59%, $P < .001$; Table 1).

TABLE 3 Hospitalization Characteristics of Children Admitted to 47 Pediatrics Hospitals From January 1, 2009 Through December 31, 2014, With Aspiration and CAP

Clinical Characteristic	Aspiration Pneumonia, $n = 12\,097$, n (%)	CAP, $n = 121\,489$, n (%)	P[a]
Hospital length of stay			<.001
1–2 d	2710 (22.4)	64 231 (52.9)	
3–7 d	5106 (42.2)	40 102 (33.0)	
>7 d	4218 (35.4)	17 156 (14.1)	
ICU care received	4022 (33.3)	14 249 (11.7)	<.001
Classification of pneumonia			<.001
Uncomplicated	11 586 (96.0)	110 616 (91.2)	
Complicated pneumonia diagnosis alone	390 (3.2)	8017 (6.6)	
Complicated pneumonia with pleural drainage procedure	90 (0.8)	2610 (2.2)	
% Receiving laboratory testing			
Complete blood count	9472 (78.3)	80 014 (65.9)	.220
Blood culture	8663 (71.6)	72 630 (60.0)	.896
Serum electrolytes	7607 (62.9)	55 819 (46.0)	.221
Viral studies	4275 (35.3)	35 966 (29.6)	.427
C-reactive protein	3452 (28.5)	29 449 (24.2)	.141
Arterial blood gas	6477 (53.5)	28 871 (23.8)	<.001
Erythrocyte sedimentation rate	779 (6.4)	9842 (8.1)	.011
Respiratory culture	6080 (50.3)	38 800 (31.9)	.121
Readmission within 30 d	4330 (35.8)	20 030 (16.5)	<.001
Hospitalization cost, $ (median, interquartile range)	14963 (7240–31848)	6115 (3431–12755)	<.001
APR-DRG Severity Classification[b]			<.001
Minor	353 (3.1)	33 807 (29.4)	
Moderate	2622 (22.8)	47 816 (41.6)	
Major	5849 (50.8)	24 442 (21.2)	
Extreme	2680 (23.3)	8974 (7.8)	

[a] Adjusted for patient age, sex, race, source of insurance payment, and the presence of complex chronic conditions.

[b] Illness severity defined as part of the All Patient Refined Diagnosis Related Groups (APR-DRG) classification[18]; statistical comparison of pneumonia groups is of patients designated as extreme versus all others.

Children with aspiration pneumonia were more likely to have a CCC compared with children hospitalized with CAP (87% vs 36%, $P < .001$) and more likely to have multiple chronic conditions. Technology dependence was the most common type of chronic condition among both groups of children occurring in 66% of children with aspiration pneumonia and 15% of children with CAP ($P < .001$). More than half of children with aspiration pneumonia had a neurologic comorbidity compared with 10% of children with CAP ($P < .001$; Table 2).

Median hospital length of stay was longer for children with aspiration pneumonia than children with CAP (5 days versus 2 days, respectively; $P < .001$), and children with aspiration pneumonia were more likely to be hospitalized longer than 1 week compared with children with CAP (35% vs 16%, respectively). Children with aspiration pneumonia were 3 times as likely to require ICU care compared with children hospitalized with CAP (33% vs 12%, $P < .001$). Hospital readmission within 30 days occurred in 36% of patients with aspiration pneumonia compared with 16% of patients with CAP ($P < .001$; Table 3). Lastly, the

median cost for hospitalization for children with aspiration pneumonia was higher than for CAP ($14 963 vs $6115; $P < .001$). Analyses limited to children without a CCC yielded similar findings. Compared with children with CAP, patients with aspiration pneumonia had longer lengths of stay (3 days vs 2 days; $P < .001$), were more likely to require admission to an ICU (22.9% vs 7.4%, $P < .001$), and incurred higher median hospitalization costs ($8127 vs $4793; $P < .001$).

Antibiotic prescribing patterns differed between children hospitalized with aspiration pneumonia and those with CAP. Among children with aspiration pneumonia, the most commonly prescribed antibiotics include cephalosporins (46%), clindamycin (44%), and ampicillin/sulbactam (40%), whereas cephalosporins were prescribed to two-thirds of children with CAP (Table 4). The use of corticosteroids was significantly greater among children with aspiration pneumonia compared with those with CAP.

Although seasonal variation was observed among hospitalizations for both CAP (incidence rate ratio [IRR] = 1.38, 95% confidence interval [CI] 1.36–1.39) and aspiration pneumonia (IRR = 1.16, 95% CI 1.12–1.21), the magnitude of the seasonal effect was significantly larger for CAP relative to aspiration pneumonia ($P < .001$; Fig 1).

TABLE 4 Antibiotics and Corticosteroid Administration to Children Admitted to 47 Pediatrics Hospitals From January 1, 2009 Through December 31, 2014, with Aspiration and CAP

Antibiotic Type	Aspiration Pneumonia, n = 12 097, n (%)	CAP, n = 121 489, n (%)	P[a]
Individual antibiotic			
Penicillin/aminopenicillin	900 (7.4)	29 829 (24.6)	<.001
Ampicillin/sulbactam	4845 (40.0)	10 131 (8.3)	<.001
Cephalosporin	5604 (46.3)	80 551 (66.3)	<.001
Macrolide	2150 (17.8)	41 850 (34.5)	<.001
Vancomycin	1835 (15.2)	14 026 (11.6)	.003
Clindamycin	5316 (44.0)	15 076 (12.4)	<.001
Piperacillin/tazobactam	1935 (16.0)	5952 (4.9)	<.001
Meropenem	311 (2.6)	2777 (2.3)	<.001
Fluoroquinolone	995 (8.2)	6289 (5.2)	.088
Other	2457 (20.3)	16 901 (13.9)	<.001
Combination antibiotics			
Cephalosporin + macrolide	1231 (10.2)	27 860 (22.9)	<.001
Cephalosporin + vancomycin/clindamycin	643 (5.3)	3230 (2.7)	<.001
Cephalosporin + vancomycin/clindamycin + macrolide	181 (1.5)	1110 (0.9)	.011
Penicillin/aminopenicillin + macrolide	167 (1.4)	8184 (6.7)	<.001
Corticosteroids	4160 (34.4)	40 427 (33.3)	.009

[a] Adjusted for patient age, sex, race, source of insurance payment, and the presence of CCC.

DISCUSSION

Children hospitalized with aspiration pneumonia differ from those with CAP, and hospitalizations for such children are longer and more costly. Additionally, children with aspiration pneumonia have higher rates of mortality, are more likely to require ICU level of care, and have higher 30-day readmission rates than children with CAP. Our study's findings are important to consider as clinicians and researchers work to improve the prognosis and care of medically complex children hospitalized with aspiration pneumonia.

Children hospitalized with aspiration pneumonia have clinical courses that are distinct from those hospitalized with CAP. These differences in hospitalization characteristics and outcomes reflect different disease processes but are also reflective of vastly different patient populations. Our study demonstrates that, compared with children with CAP, patients hospitalized with aspiration pneumonia are more like to have a CCC. Comorbidities including oropharyngeal dysfunction,[3,24–26] neurologic dysfunction,[5,7,27] esophageal motility disorders,[28] and enteral tube feeding[2,29] are well described risk factors predisposing toward aspiration and aspiration pneumonia. These comorbidities represent a breakdown of the usual protective mechanisms that prevent repeated and large volume aspiration of oropharyngeal contents.[1] Unlike CAP, this pathophysiology may also explain the decreased seasonality observed among patients hospitalized with aspiration pneumonia.[30]

Previous studies have demonstrated that children with CCCs and those assisted by medical technology use a high proportion of inpatient resources, and have longer and more costly hospitalizations.[6] One recent study demonstrated that children with neurologic impairment diagnosed with aspiration pneumonia have more complications and use more hospital resources than children hospitalized with non–aspiration pneumonia,[7] implying an additive degree of cost and acuity with the diagnosis of aspiration pneumonia beyond simply the medically complex patients themselves. Our study builds on these findings and includes a broader cohort of patients with a variety of predisposing comorbidities and medical assistive technologies. We also observed that children with aspiration pneumonia are significantly more likely to be readmitted within the 30-day period after hospital discharge. The cost of readmissions for CAP in children is substantial and has previously been shown to be even higher among those with chronic medical conditions.[31] Higher rates of readmission among patients diagnosed with aspiration pneumonia reflect a need for improved care coordination in the outpatient setting for this vulnerable patient population.

Aspiration pneumonia likely represents a clinical entity within a heterogenous group of disorders that make up the pulmonary aspiration syndromes.[32] These conditions include chemical pneumonitis, bland aspiration, hospital-acquired pneumonia,

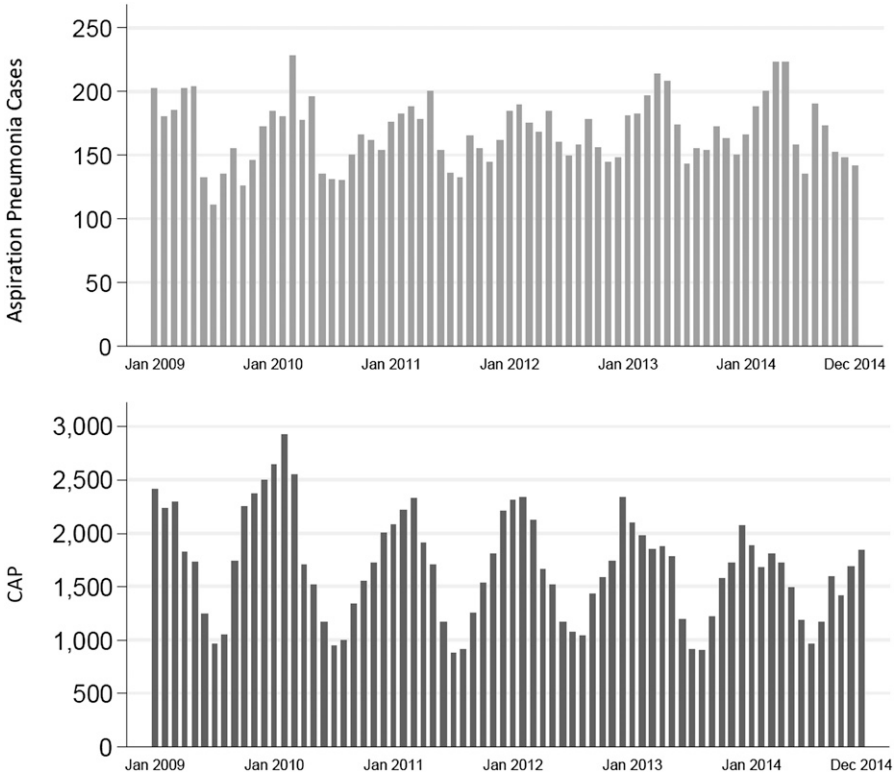

FIGURE 1 Number of hospitalizations for aspiration pneumonia (upper panel) and CAP (lower panel) per month across the 47 study hospitals. Although seasonal variation was observed among hospitalizations for both CAP (IRR = 1.38, 95% CI 1.36–1.39) and aspiration pneumonia (IRR 1.16, 95% CI 1.12–1.21), the magnitude of the seasonal effect was significantly larger for CAP relative to aspiration pneumonia (χ^2 for interseasonal δ between groups, $P < .001$).

and aspiration pneumonia.[1] In reality, there is a large amount of overlap between these entities, which are often difficult to distinguish clinically and conflated in the clinical setting.[3] Antibiotic treatment strategies reflect an attempt to capture the different microbiological profiles that distinguish CAP from aspiration pneumonia. Historical studies investigating the bacteriology of aspiration pneumonia demonstrated a high proportion of anaerobic bacteria but were performed on a group of patients with high rates of chronic alcoholism and cultures that were often obtained after complications had occurred.[33] More recent studies have not shown anaerobes to be a significant pathogen and instead demonstrate Gram-positive cocci and Gram-negative rods to be more representative causal pathogens.[34,35] The traditional approach of using antibiotics that provide anaerobic coverage was observed in our study, with a much larger proportion of the patients diagnosed with aspiration pneumonia, relative to patients diagnosed with CAP, receiving treatment with ampicillin-sulbactam or clindamycin. Antibiotics with a more narrow coverage profile have been shown to be equally efficacious in patients diagnosed with aspiration pneumonia,[36] and our findings may reflect an opportunity to improve antibiotic stewardship in pediatric tertiary care hospitals.

Our study is subject to several limitations inherent to use of an administrative database and to the retrospective nature of the study. Patient identification relied on the use of ICD-9 diagnosis codes; as such, misclassification of patients is possible. We relied on the use of validated codes for the identification of CAP; however, validated codes are not available for aspiration pneumonia.[11] The administrative database used for this study has a paucity of clinical information available, particularly around the severity of illness of the patient. Our study also only examined inpatient care, so we are not able to evaluate differences between CAP and aspiration pneumonia in the emergency department or outpatient settings. There is likely inherent bias in the labeling of a diagnosis of aspiration pneumonia in a child with a chronic condition, which could account for some of our findings. However, analyses restricted to children without a chronic condition were not materially different from our main results. We were also unable to discern whether corticosteroids were administered as adjunctive therapy for pneumonia or for treatment of concurrent asthma exacerbation. Finally, our study was conducted among children cared for at free-standing children's hospitals that serve as referral centers for large numbers of children with complex medical conditions and may not be generalizable to all health care settings.[37,38]

CONCLUSIONS

Our study is the first to describe the clinical and hospital characteristics of a broad cohort of children hospitalized with aspiration pneumonia. When compared with children with CAP, children hospitalized with aspiration pneumonia are more likely to have a chronic condition and are more likely to receive care in an ICU, have higher costs of hospitalization, and have higher 30-day readmission rates after hospital discharge. Our study underscores the need for future research to optimize coordination of care and treatment of children at risk for aspiration pneumonia.

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