



Letter

Allergy and immunology inpatient and emergency department consultations at a pediatric academic medical center

Allergy and immunology (A/I) is a subspecialty commonly associated with outpatient care; however, A/I specialists can provide important services to patients in the emergency department (ED) and inpatient settings. This is especially true in large tertiary care centers where patients with complex diagnoses present for acute and chronic medical issues. The services provided by A/I specialists can assist patients with a variety of disease processes who may be admitted to different subspecialty services within the hospital. A/I responses underlie many disease processes because it is a mechanism-based field vs an organ-specific one.¹ Although consultation for patients in the inpatient and ED settings at academic centers is important for education of trainees, it also provides insight into the patients' medical management and allows important continuity of care in 2 different regards.² First, patients in the ED or inpatient wards who are already known to A/I specialists receive input from physicians familiar with their clinical history. Second, any new patient seen in consultation by the A/I service obtains an evidence-based diagnostic evaluation, receives relevant education and recommendations regarding their diagnosis, and, if necessary, schedules outpatient follow-up before discharge from the hospital.

To determine the number and types of consultations performed by the A/I service at a tertiary care academic pediatric medical center, we performed a retrospective review of all consultations within the ED and inpatient settings during a 5-year period from July 1, 2009, to June 30, 2014. During that time, a total of 473 consultations (mean [SD], 94.6 [7.45] per year) were completed by the A/I service. No significant difference was found in the number of consultations completed each year. Of note, the A/I service at Nationwide Children's Hospital does not serve as the primary management team for any patients admitted to the hospital.

Demographic information regarding age, sex, reason for consultation, and follow-up visits are listed in Table 1. The 3 most common reasons for consultation were evaluation of potential or known primary immunodeficiency disorder (PID) (57%), urticaria and/or angioedema (11%), and food allergy (10%). Only 9 (2%) of the consultations were related to asthma. The low number of asthma consultations is not reflected in other studies on allergy and immunology inpatient consultation.^{2–5} The low number in our study likely stems from the distribution of services at our institution, which includes a busy pulmonary inpatient ward and consultation service. Diagnostic evaluation and ongoing management of patients with PID are important services provided by A/I specialists and constitute most consultations at our institution. Our study identified much higher numbers of PID consultations compared with previous studies, which likely reflects the absence of adult patients and

the large volume of pediatric patients admitted to our institution. More than half (157 [59%] of 267) of the patients with consultations related to PID were younger than 2 years. This finding is likely secondary to the early presentation of many PIDs. Among all consultations for PID, 58% were male ($P < .001$). This higher percentage compared with females likely relates to the preponderance of X-linked primary immunodeficiencies.

Consultations to A/I specialists were made by a wide variety of inpatient services staff, including subspecialists and intensive care unit staff. The infectious disease service requested 30% of all consultations during this time frame. This is not surprising because patients with PIDs at our institution are typically admitted to the infectious disease service for management of acute infection.

Inpatient consultation is an important service provided by A/I specialists to ensure continuity of care for established and newly evaluated patients. Among all consultations during the study period, 307 (65%) involved patients not previously evaluated by A/I specialists, and 166 (35%) involved children who were previously known to our service. A total of 369 patients accounted for all 473 consultations, with 42 patients (11.4%) receiving 2 or more consultations (mean, 3.48 per patient). Twenty-one patients (5.7%) had 3 or more consultations during that time frame. Of the 42 patients who required more than one consultation, 32 (76%) were children with known or suspected PID. Among the 307 new patients who were seen in consultation, 174 (57%) were recommended for outpatient follow-up with an A/I specialists as part of their treatment plan. Of those patients, 114 (66%) returned to the A/I clinic after discharge for follow-up evaluation (Table 1).

This is a retrospective study with its inherent weaknesses. Although a large number of patients are included in our study, it is restricted to one institution, which may limit its generalizability to other pediatric populations. Nationwide Children's Hospital is located in Columbus, Ohio, and is the only freestanding pediatric academic hospital within a 70-mile radius. In 2014, there were 15,671 discharges from the inpatient units at Nationwide Children's Hospital's main campus. During that same year, there were 86,052 visits to the ED.

Previous studies have reported inpatient A/I consultations, but these studies included a mixture of adult and pediatric patients.^{2–5} Our number of pediatric patients was similar to other studies (median, 322.5; range, 165–913). We identified PID as the reason for 57% of consultations, which was much higher than other studies (13%–18%).^{2–5} Unlike our findings, asthma was the leading reason for consultation in 3 similar studies, ranging from 43% to 72% of all consultations.^{2,3,5} To our knowledge, ours is the first study evaluating A/I consultations solely at a large pediatric academic medical

Table 1
Demographic Information by Reason for Consultation

Variable	Total	Immune deficiency	Urticaria angioedema	Food allergy	Drug allergy	Anaphylaxis	Eczema	Asthma	Eosinophilia	Other ^a	P value
No. (%) of consultations	473 (100)	267 (57)	53 (11)	49 (10)	28 (6)	23 (5)	11 (2)	9 (2)	9 (2)	24 (5)	
Male, No. (%)	275 (58)	154 (58)	27 (51)	31 (63)	16 (57)	16 (70)	4 (36)	5 (56)	5 (56)	17 (71)	<.001
Patient age, mean (range), y	7.4 (0–32)	6.5 (0–23)	12.51 (0.2–19)	2.33 (0.1–16)	12.54 (1–26)	10.24 (0.2–18)	3.52 (0.2–14)	5.78 (1–17)	9.04 (0.1–18)	9.52 (0.4–32)	<.001
Recommended outpatient follow-up visits, No. (%)	174 (37)	81 (30)	13 (25)	26 (53)	6 (21)	15 (65)	9 (82)	3 (33)	5 (56)	21 (88)	<.001
Visits completed, No. (%)	114 (66)	54 (67)	8 (62)	21 (81)	3 (50)	7 (47)	7 (78)	2 (67)	4 (80)	8 (38)	<.001

^aOther diagnoses include eosinophilic esophagitis, rash, hypersensitivity pneumonitis, cough, and mast cell disorder.

center. Future research should identify whether similar A/I consultation patterns are occurring in other pediatric academic institutions.

Our findings indicate the important role of A/I consultation within pediatric inpatient and ED settings. These patient care interactions allow for the provision of directed diagnostic evaluation and evidence-based and current treatment recommendations. Another important aspect to consider is the benefit of ensuring appropriate outpatient follow-up and continuity of care for patients seen in the inpatient setting. The continuity of care for children with allergic conditions provided by board-certified A/I specialists is an important aspect of our specialty that can be augmented through inpatient consultations.

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