Clinical Communications

Intravenous access is rarely necessary in food protein-induced enterocolitis syndrome oral food challenges

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Clinical Implications

Intravenous access may not be necessary before food protein-induced enterocolitis syndrome oral food challenges because these types of reactions infrequently require intravenous rehydration.

Food protein-induced enterocolitis syndrome (FPIES) is a non−IgE mediated food allergy diagnosed by a clinical history of repetitive vomiting that begins approximately 1 to 4 hours after food ingestion. Oral food challenges (OFCs) are recommended to confirm the diagnosis when the clinical history is unclear, to evaluate for the resolution of FPIES, and to introduce new high-risk foods safely (based on previously published FPIES guidelines).[1] Various FPIES OFC protocols have been published; however, they have not been validated by large studies, and practices vary.[2] International guidelines currently state that some experts recommend securing peripheral intravenous (IV) access before the OFC because at least 15% of reactions may result in hypotension.[1] Our primary aim was to evaluate the use of IV catheters for the administration of IV fluids (IVF) in the treatment of OFC reactions at our center to determine whether IV placement is necessary before conducting an FPIES OFC.

We performed a retrospective chart review for all patients who underwent FPIES OFCs from July 2010 to August 2022. Demographics, the reaction history (implicated food, symptoms, treatment, and emergency room visit), and OFC-related data including IV placement, the challenge outcome, the reaction, and the treatment were evaluated. The University of Texas Southwestern Medical Center Institutional Review Board granted chart review approval.

All patients underwent an open FPIES OFC at the Food Allergy Center at Children's Medical Center. Intravenous placement before the challenge was per clinician discretion. We performed FPIES OFCs with a single-serving protocol by administering 0.3 g food protein/kg body weight (not exceeding 3 g food protein) followed by a 4-hour observation period. Some challenges before 2018 included a second full-serving dose 2 to 3 hours after the first dose, according to provider discretion, but we previously showed that this second dose was not necessary.[3]

We reviewed 185 FPIES OFCs completed in 108 patients (54 males and 54 females) (see Table E1 in this article's Online Repository at www.jaci-inpractice.org). Most challenges (48%) were performed to evaluate for the resolution of FPIES (Table E1), mean time since the last FPIES reaction, 19 months. Intravenous access was obtained before 44 OFCs, whereas 141 OFCs were performed without IV placement. Reactions occurred in 15.6% of OFCs (29 of 185 challenges). Median age at OFC for positive challenges was 26 months. Fifty percent of patients with positive OFCs had a prior emergency room visit for an FPIES reaction. Of those with positive challenges, two did not require treatment, two responded to treatment with antihistamines (atypical FPIES reactions), 13 responded well to intramuscular (IM) or oral ondansetron (oral administration was given per parental preference), six responded to IV ondansetron (given because of the ease of administration in patients with IV placed before the challenge), and six did not respond to initial IM or IV ondansetron treatment and received IVF (Figure 1).

We administered IV rehydration after antiemetics in 3.2% of total OFCs performed (six of 185 challenges). Table I lists the characteristics of patients with a positive OFC who were treated with IV rehydration. These six challenges were performed in five patients, because one patient reacted during two separate OFCs. Patients in whom IV rehydration was administered were primarily female (four of five patients), and most had a prior emergency department visit for FPIES reaction (four of five patients). In these challenges, IV access was placed before the challenge in three OFCs and after the reaction in three (Figure 1). Patients were initially treated with IV or IM ondansetron (IV ondansetron when the placement was IV before the challenge) and received IVF because they continued to have emesis (all six) with associated lethargy or pallor (three of six) or refusal to take it orally (two of six) after it was administered. No patients had hypotension. Patients who responded to treatment with IV, IM, or oral ondansetron were monitored for a mean of 176 minutes after the onset of symptoms before discharge, whereas patients treated with IV or IM ondansetron and IVF were monitored for a mean of 238 minutes. All patients were successfully managed in the clinic, and no patients necessitated emergency room transfer.

The approach to conducting FPIES OFCs is not standardized. Because of the resources required for IV access before the challenge, it is important to assess the necessity of IV access to treat reactions. Wang et al[4] reported their experience with 169 FPIES OFCs. In their cohort, of 17 patients (10%) with positive FPIES OFCs, 14 (7.1%) received IVF for repeated episodes of emesis, in which two patients developed hypotension. Other studies reviewing smaller cohorts of FPIES OFCs reported administering IVF in two (8.3%) of 24 OFCs[5] and in three (7.7%) of 39 OFCs.[6] These rates of IVF administration for FPIES OFC reactions are higher than those seen in the current cohort, in which only 3.2% of total OFCs were treated with IVF and no patients experienced hypotension.

In the current cohort, most FPIES OFC reactions (23 of 29) responded to treatment with ondansetron (oral, IM, or IV) and did not require further treatment with IVF. In addition, 13 of 16 patients treated with oral or IM ondansetron responded and did not require IVF, which suggests that these modes of antiemetic administration may be efficacious for FPIES reactions, obviating the need for IV placement. For reactions that did not respond to treatment with ondansetron, 50% of patients had an IV catheter placed in the clinic for IVF after the

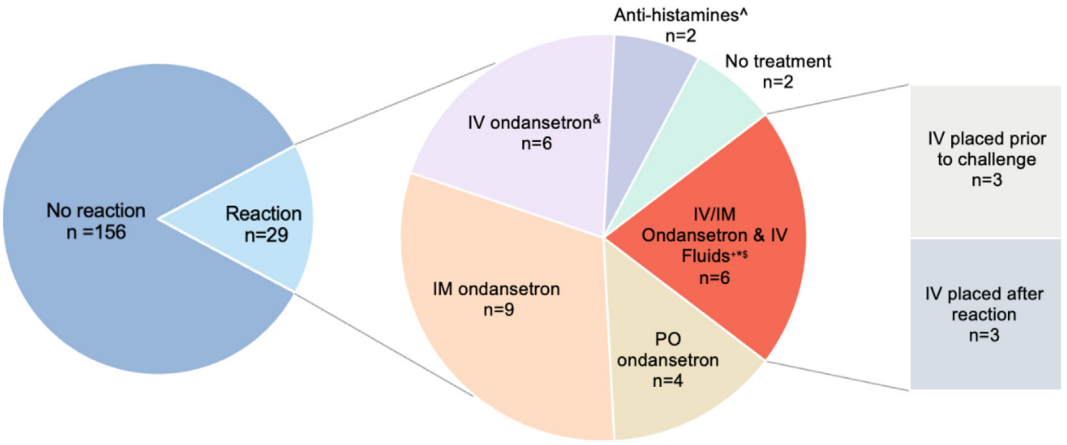

FIGURE 1. Food protein-induced enterocolitis syndrome oral food challenge reaction treatment and intravenous (IV) placement for fluid administration. *All patients treated with IV fluid rehydration responded well and did not need transfer to an emergency department. +No patients with hypotension. $Patients with a IV line placed before the challenge were treated with IV ondansetron before IVF, and patients without a IV line placed before the challenge were treated with intramuscular (IM) ondansetron before IV fluids. ^Patients treated with antihistamines had (1) itching, hives, and vomiting with 30 minutes of ingestion; and (2) severe abdominal pain within 15 minutes of ingestion. *PO*, oral.

TABLE I. Characteristics of patients with Positive FPIES oral food challenge treated with IV rehydration

Patient	Sex	Prior FPIES emergency department visit	Time since last FPIES reaction, min	Age at oral food challenge, mo	Reason for challenge	Challenge food	IV before challenge	Reaction	Treatment
1	F	No	2	16	Introduce high-risk food	Peanut	No	E, P, L, diarrhea	IM ondansetron, IVF
2	M	Yes	12	42	Evaluate for resolution	Baked egg	Yes	E, P, AP	IV ondansetron, IVF
3	F	Yes	25	33	Evaluate for resolution	Wheat	Yes	E, L	IV ondansetron × 2, IVF × 2*
3	F	Yes	12	63	Introduce high-risk food	Beef	Yes	E, AP, P	IV ondansetron, IVF
4	F	Yes	30	56	Evaluate for resolution	Soy	No	E, L, P	IM ondansetron, IVF
5	F	Yes	9	16	Confirm diagnosis	Milk	No	E, sneezing, fever	IM epinephrine, IM ondansetron, IVF, acetaminophen suppository, oral ibuprofen†

AP, abdominal pain; *E*, emesis; *FPIES*, food protein-induced enterocolitis syndrome; *IM*, intramuscular; *IV*, intravenous, *IVF*, intravenous fluids; *L*, lethargy; *P*, pallor, *IVF*, IV fluids.

*Patient 5 had emesis and sneezing 90 min after the dose, received IM epinephrine with continued vomiting, and received IM ondansetron and IVF. The patient then had a fever for which she was treated with acetaminophen and ibuprofen.

†Patient 3 received both IV ondansetron and IVF with the first episode of emesis, continued to have emesis and lethargy, and received a second dose of ondansetron and a second bolus with IVF.

reaction started. Regardless of whether an IV line was placed before the challenge or after reaction, all patients recovered in the clinic and did not require escalation in care. This demonstrates that IV access could be secured after a reaction during FPIES OFCs and does not necessarily need to be placed before a challenge for all patients.

Limitations of this study include the retrospective nature of data analysis and the performance of our FPIES OFCs at an academic center with resources for IV placement such as an IV team. There also may have been bias because the study evaluating only patients who underwent OFCs, as opposed to a full review of all FPIES patients.

These data suggest that IV access may not be necessary before FPIES OFCs, because FPIES OFCs infrequently require IV rehydration. Further studies are required to standardize the approach to FPIES OFCs.

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TABLE E1. Patient characteristics

Characteristics	Overall	Positive oral food challenges	Negative oral food challenges
Patients	108	24 (22%)	95 (88%)
Challenges	185	29 (16%)	156 (84%)
Sex			
Female	54 (50%)	13 (54%)	46 (48%)
Male	54 (50%)	11 (46%)	49 (52%)
Race			
Black	2 (2%)	0	2 (2%)
Asian	5 (5%)	3 (13%)	4 (4%)
Hispanic	7 (6%)	2 (8%)	6 (6%)
White	94 (87%)	19 (79%)	83 (87%)
Age at challenge, y			
0 to <1	39 (21%)	3 (10%)	36 (23%)
1 to <2	67 (36%)	9 (31%)	58 (37%)
2 to <3	36 (19%)	8 (27%)	28 (18%)
3 to <4	22 (12%)	3 (10%)	19 (12%)
4 to <5	14 (8%)	4 (14%)	9 (6%)
5 to <6	5 (3%)	2 (7%)	4 (3%)
>6	2 (1%)	0	2 (1%)
Challenge food			
Milk	40 (22%)	6 (21%)	34 (22%)
Wheat	34 (18%)	2 (7%)	32 (21%)
Soy	16 (9%)	2 (7%)	14 (9%)
Rice	17 (9%)	2 (7%)	15 (10%)
Oat	15 (8%)	2 (7%)	13 (8%)
Egg	12 (6%)	5 (17%)	8 (5%)
Peanut	9 (5%)	4 (14%)	5 (3%)
Other	42 (23%)	6 (20%)	35 (22%)
Reason for challenge			
Evaluate for resolution	89 (48%)	21 (73%)	68 (44%)
Introduce high-risk food	84 (45%)	3 (10%)	81 (52%)
Confirm diagnosis	12 (6%)	5 (17%)	7 (4%)
Prior emergency department visit for food protein-induced enterocolitis syndrome			
Yes	59 (55%)	12 (50%)	43 (45%)
No	49 (45%)	12 (50%)	52 (55%)