101 Development and Implementation of a Mobile Data Capture System for Oral Immunotherapy

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RATIONALE: Oral immunotherapy (OIT) is increasingly gaining acceptance as a food allergy treatment. Treatment success requires adherence to daily dosing and adjustments due to missed doses, illness, or adverse events (AEs). Therefore, treatment teams need timely access to safety and adherence data.

METHODS: We built an online data entry platform using MyCap, an external module available at no cost to institutions using REDCap (Vanderbilt University Medical Center, Nashville, TN). MyCAP is designed for frequent patient-reported task input, natively renders for iOS and Android phones, syncs with REDCap, and is viewable from within our electronic health record (EHR) (Epic, Madison WI). We built a prototype and refined logic, resulting in 2-9 questions depending on medication adherence and the presence of key allergic dosing symptoms. After testing logic, we launched MyCap in our clinical OIT program.

RESULTS: 100 % of OIT patients/caregivers adopted use after launch. 21 of 23 have entered data on >90% of dosing days. Currently we have collected AE and adherence data for >1800 home and >300 clinic OIT exposures. Most users' data completion rates decline over time, such that those in the maintenance phase of OIT rarely enter data.

CONCLUSIONS: A smartphone-enabled and EHR-linked data system to capture adherence, AEs, and patient-reported outcomes is feasible and inexpensive. Initial adoption of this system is valuable to OIT patients/caregivers and providers to promote successful up-dosing to maintenance therapy. Daily use of this system declined over time, emphasizing the challenge of long-term engagement and the importance of parsimonious design features.

102 Never Too Late – Food Allergy Desensitization In The Adult Population

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RATIONALE: Oral Immunotherapy (OIT) in the adult food allergic population has been identified as an important gap of knowledge in clinical practice guidelines. We aimed to assess and characterize the success of OIT in our patients 18 years and older.

METHODS: A retrospective chart review was conducted for adults who underwent OIT between January 2017 and August 2022 at the Centre Hospitalier de l'Université de Montréal's allergy clinic. Patient age, sex and clinical characteristics were compared to identify potential predictors of treatment failure and difficulty. Treatment failure was defined as discontinuing treatment due to lack of tolerance or compliance. Treatment difficulty was determined by global appreciation of patient progress by two independent assessors. Disagreement was resolved through discussion.

RESULTS: 62 patients were identified during the study period. 32 (51%) were female. The median age was 23 years (IQR 20-28). The most frequent allergen included in treatment was peanut (76%). Seven patients (11.3%) were identified as treatment failures and 25 (40%) were considered difficult OIT. No statistically significant predictors of success were identified, but serum allergen-specific IgE levels were associated with greater odds of difficult OIT ($p<0.0005$).

CONCLUSIONS: To our knowledge, this is the first real-life cohort of food oral immunotherapy focusing exclusively on the adult population. Our data demonstrates that OIT is possible in adulthood, with success and difficulty rates comparable to those reported in the pediatric population. Larger studies are needed to evaluate OIT in adults more extensively.

103 Multiplexed Tissue Imaging for Immune Cells Profiling During Peanut Allergy Immunotherapy

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RATIONALE: Oral immunotherapy (OIT) can desensitize food allergic individuals to offending food allergens. However, OIT-induced changes in tissue-resident immune cell subsets remain largely unexplored. We investigated peanut-OIT-induced spatial and temporal changes in gastrointestinal (GI) tract biopsies taken from our phase 2 peanut OIT trial-POISED using Multiplexed Ion Beam Imaging (MIBI).

METHODS: MIBI data was acquired on FFPE sections from GI tissue (stomach and duodenum) biopsies of 7 (5 active and 2 placebo) OIT participants at four different time points, viz., baseline, week 52, 104, and 117. On each tissue section, 37 markers were simultaneously quantified, and cell types were predicted using respective markers by state-of-the-art computational methods.

RESULTS: Mast cells and plasma cells were found to be the most abundant and prominent immune cell type in stomach and duodenal sections, respectively. In the stomach, mast cells were found to be the highly variable cell type over the course of OIT, changing its abundance and spatial vicinity with other cell types, including $CD4^+$ and $CD8^+$ T cells. In the duodenum, plasma cells were found to be the most dispersed cell type, frequently observed in the microenvironment of T cell subtypes of active participants. We also found the variable spatial profile of IgA^+ plasma cells in active participants than placebo.

CONCLUSIONS: Examination of GI biopsies at subcellular resolution offered possible new insights into OIT-induced structural and functional relationships of immune cells in the context of peanut allergy and OIT-induced desensitization.

104 The Impact of Persistent Gastrointestinal Symptoms on Completion of Oral Immunotherapy in Clinical Trials

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RATIONALE: Although oral immunotherapy (OIT) is an effective treatment option for food allergy it can be complicated by persistent gastrointestinal (GI) reactions. The impact of GI symptoms on the outcome of OIT is not known.

METHODS: Data from 2 IRB-approved clinical research trials at our research center utilizing single allergen immunotherapy with a maintenance dose of 1000 mg and 4000 mg were reviewed. Persistent gastrointestinal (GI) symptoms were defined as having >= 4 days of symptoms a week for 2 consecutive weeks.

RESULTS: A total of 58 participants in the 1000 mg maintenance group and 116 participants in the 4000 mg group were analyzed. Persistent GI symptoms were reported by 13.8% (n=8) in the 1000 mg and 11.9% (n=14) in the 4000 mg maintenance groups. Withdrawal rates were not statistically different among those with GI symptoms (n=5) and those without (n=35) across both maintenance groups. For participants who successfully reached maintenance, time to maintenance (TTM) was longer in those with GI symptoms compared to those without in both groups, however it only reached statistical significance in the 4000 mg maintenance group with a median time of 62.3 weeks in those with GI symptoms compared to 54.2 weeks in those without ($p=0.008$).

CONCLUSIONS: Persistent GI symptoms did not increase withdrawal rates in trials involving OIT, however TTM was longer and reached significance in the group with a higher maintenance dose. Shared decision making and close monitoring is required to manage GI symptoms with OIT but can lead to successful outcomes in clinical trials.