Canadian Society of Allergy and Clinical Immunology Annual Scientific Meeting 2010
Victoria, Canada. 3-6 November 2010
Published: 4 November 2010

These abstracts are available online at http://www.aacijournal.com/supplements/6/S2

**POSTER PRESENTATIONS**

**P1**

**Quality of penicillin allergy management in the intensive care unit and internal medicine ward**

Philipp Bégin†, Matthieu Picard†, Émilie Daoust, Louis Paradis, Brian Lauter

†Department of medicine, Hôpital Maisonneuve-Rosemont, Université de Montréal, Montreal, Canada, H1T 2M4; ‡Department of medicine, Centre Hospitalier de l’Université de Montréal, Montreal, Canada, H2L 4M1

**Background:** Penicillin allergy is reported by 10% of the population [1]. The associated morbidity is substantial given its medical and economic implications [2-4]. The aim of this study was to assess the quality of care with regards to the management of penicillin allergy in a university affiliated general hospital with no allergy service.

**Material and methods:** All admissions from December 1st 2008 to December 1st 2009 were hand reviewed for a notation of penicillin allergy. Files were then assessed for (1) quality of allergic history to penicillin, (2) referral to an allergy clinic upon discharge, (3) indications for such a referral, (4) indication for a beta-lactam, and in the latter case, (5) management of antibiotic therapy.

**Results:** Of the 1738 files reviewed, 172 contained a notation of alleged penicillin allergy. History of the reaction to penicillin was poorly detailed even when patients required beta-lactam therapy (table 1). In the 87 patients who did require a beta-lactam, half received it without any skin testing, challenge or desensitization. No adverse reaction occurred. The associated morbidity is substantial given its medical and economic implications [2-4]. The aim of this study was to assess the quality of care with regards to the management of penicillin allergy in a university affiliated general hospital with no allergy service.

**Conclusion:** Penicillin allergy is a frequent problem in hospital practice. Its management is not optimal in most cases. This study stresses the importance of continuous medical education on this subject and the importance of a readily available inpatient allergy service to support hospital practitioners.

**References**


**Table 1 (abstract P1) Details included in allergy history**

<table>
<thead>
<tr>
<th>Argument</th>
<th>All patients (n=172)</th>
<th>Patients with indication for beta-lactam (n=87)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy to penicillin noted in admission note</td>
<td>139 (81%)</td>
<td>69 (79%)</td>
</tr>
<tr>
<td>Allergy tag on file</td>
<td>119 (69%)</td>
<td>66 (76%)</td>
</tr>
<tr>
<td>Molecule specified</td>
<td>31 (18%)</td>
<td>23 (26%)</td>
</tr>
<tr>
<td>Allergic reaction described</td>
<td>52 (30%)</td>
<td>27 (31%)</td>
</tr>
<tr>
<td>Delay since reaction noted</td>
<td>7 (4%)</td>
<td>5 (6%)</td>
</tr>
<tr>
<td>Treatment of allergic reaction noted</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table 2 (abstract P1) Strong arguments for allergy referral**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Number of patient (n=172)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy to a non beta-lactam antibiotic</td>
<td>37 (22%)</td>
</tr>
<tr>
<td>Immunosuppressive treatment</td>
<td>15 (9%)</td>
</tr>
<tr>
<td>Chronic disease (COPD, CKD on dialysis, complicated diabetes)</td>
<td>85 (49%)</td>
</tr>
<tr>
<td>Admitted for acute infection</td>
<td>72 (42%)</td>
</tr>
<tr>
<td>Planned surgery</td>
<td>49 (28%)</td>
</tr>
<tr>
<td>Any</td>
<td>128 (74%)</td>
</tr>
<tr>
<td>Any and survived hospitalisation</td>
<td>97 (56%)</td>
</tr>
</tbody>
</table>

documented in only 18%. Upon discharge, only two patients were referred to an allergy clinic for elective penicillin skin testing, even though referral was strongly indicated in 97 patients (table 2).

**Conclusion:** Penicillin allergy is a frequent problem in hospital practice. Its management is not optimal in most cases. This study stresses the importance of continuous medical education on this subject and the importance of a readily available inpatient allergy service to support hospital practitioners.

**References**


**P2**

**Review of food challenges in a pediatric tertiary care centre**

Alison Haynes†, Wade Watson‡, Gregory Rex§, Sandeep Kapur*†

*†Department of Pediatrics, Memorial University, St. John’s Newfoundland; ‡Department of Pediatrics, Dalhousie University, Halifax Nova Scotia

E-mail: haynesalison@yahoo.com

Allergy, Asthma & Clinical Immunology 2010; 6(Suppl 2):P2

**Background:** Oral food challenges are essential to determine when foods can be safely reintroduced in children with diagnosed food allergies.

**Results:** Of the 1738 files reviewed, 172 contained a notation of alleged penicillin allergy. History of the reaction to penicillin was poorly detailed even when patients required beta-lactam therapy (table 1). In the 87 patients who did require a beta-lactam, half received it without any skin testing, challenge or desensitization. No adverse reaction occurred. The associated morbidity is substantial given its medical and economic implications [2-4]. The aim of this study was to assess the quality of care with regards to the management of penicillin allergy in a university affiliated general hospital with no allergy service.

**Conclusion:** Penicillin allergy is a frequent problem in hospital practice. Its management is not optimal in most cases. This study stresses the importance of continuous medical education on this subject and the importance of a readily available inpatient allergy service to support hospital practitioners.

**References**

Identifying risks for failed challenges and severity of reactions is important for continuing safe practices.

**Material and Methods:** A retrospective chart review from January 2008 to March 2010 was conducted. Data extracted included age, food tested, ImmunoCAP level, reaction, type of symptoms and treatment received.

**Results:** Of 322 challenges (median age 4.8 years), 204 (63%) passed, 89 (28%) failed and 29 (9%) refused to complete the challenge. Passed challenges included 54 (26%) egg, 52 (25%) peanut, 32 (16%) milk, 22 (11%) tree nuts, 17 (9%) fish and shellfish and 27 (13%) others. Failed challenges included 43 (48%) peanut, 17 (19%) egg, 12 (13%) milk, 5 (7%) tree nuts, 4 (4%) fish and shellfish and 8 (9%) others. ImmunoCAP medians for passed challenges were peanut 0.35 KU/L, egg 0.45 KU/L and milk 0.35KU/L. Failed challenges ImmunoCAP medians were peanut 0.74 KU/L, egg 0.95 KU/L and milk 0.97 KU/L. Symptoms included 77 (86%) cutaneous/mucus membrane, 8 (9%) respiratory and 19 (21%) gastrointestinal. No patients had cardiovascular symptoms. Epinephrine was required to treat 14 (16%), prednisone in 10 (11%), antihistamine in 49 (55%) and bronchodilator in 2 (2%) reactions. 35 (39%) of patients did not require any treatment. There were no hospital admissions or deaths reported.

**Conclusions:** Reactions associated with controlled food challenges are frequently mild and reversible with treatment. ImmunoCAP levels in successful challenges tend to be lower compared to failed challenges.

---

**P3**

**Comparing wheat flour and commercial wheat extract skin prick testing in Wheat Dependent Exercise Induced Anaphylaxis**

Lana A Rosenfield¹, Chrystyna Kalicinsky²

¹Faculty of Medicine, University of Manitoba, Winnipeg, Canada; ²Section of Clinical Immunology and Allergy, University of Manitoba, Winnipeg, Canada

E-mail: lanarosenfield@me.com

Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P3

**Background:** Wheat Dependent Exercise Induced Anaphylaxis (WDEIA) is a form of Food Dependent Exercise Induced Anaphylaxis. WDEIA occurs when there is an allergic reaction following the ingestion of wheat, coupled with exercise [1]. The suspected allergen that is responsible for WDEIA is omega-5 gliadin [2]. We report a series of adult clinical cases of WDEIA recorded between 2006-2009 at Health Sciences Centre (Winnipeg). The purpose of this study was to compare the results of Skin Prick Test (SPT) to commercial wheat extract and wheat flour in patients with WDEIA.

**Materials and methods:** We performed a retrospective chart review of 8 patients with WDEIA. We recorded response to SPT for commercial wheat extract (Omega, Allergy Canada) and wheat flour.

**Results:** The patients were 25-63 years old, 5/8 were female. All patients had histories of wheal consumption followed by exercise (or stress) resulting in allergic reactions. 5/8 cases were SPT negative to commercial wheat extract but positive to wheat flour. 1/8 was SPT negative with both commercial wheat extract and wheat flour, but positive with the wheat product (bun), which by history provoked a reaction. 1/8 was SPT positive to both. 1/8 was positive to wheat extract but SPT to wheat flour was not done. When patients adhered to wheat avoidant diets no reactions occurred.

**Conclusion:** In the 8 adults reviewed with WDEIA, SPT with wheat flour was much more sensitive than SPT with commercial wheat extract. Therefore, both commercial wheat extract and wheat flour should be used for SPT to diagnose WDEIA.

**References**

Results: Of the 105 participants that enrolled in the program, complete data was available for 74 participants. There was a significant improvement in knowledge F(1,66)=27.7, p<0.001 with the mean pretest score of 51.1% and mean posttest score of 78.2%; giving a large effect size for the intervention of 1.7. Participant confidence to use an auto-injector in an emergency rose dramatically following the program, and learners were very satisfied with the program.

Conclusions: Our Internet-based training program on anaphylaxis is a highly effective training program for school personnel. Further research on optimal implementation strategies and longitudinal follow-up of knowledge, skills and attitudes is required.

Acknowledgements: This research was supported by AllerGen NCE Inc.

The program was developed by Anaphylaxis Canada, the Canadian Society of Allergy and Clinical Immunology, and Leap Learning Technologies Inc., with additional support from the Government of Alberta and the Division of e-Learning Innovation at McMaster University.

References

P6
Flax seed allergy in children: an emerging allergen?
Andrew O'Keefe1,*, Sandeep Kapur2, Gregory Rex3, Wade Watson4
1Department of Pediatrics, Memorial University, St. John's, Newfoundland; 2Department of Pediatrics, Dalhousie University, Halifax, Nova Scotia; 3Department of Pediatrics, The Hospital for Sick Children, Toronto, ON, Canada; 4Department of Pharmacology, The Hospital for Sick Children, Toronto, ON, Canada

Background: Flax is a plant that is widely cultivated and has multiple uses. The seed has been increasingly used in food, and the fibers are used in textiles. Oils have also been extracted from the seed for use as a laxative and in industrial preparations. Allergic reactions to flax seed ingestion as well as linseed oil (flaxseed oil) ingestion have been described in the literature in adults [1-5], but not in children.

Material and methods: We report four cases of flax seed allergy in children.

Results: See table 1.

Conclusions: Few cases of flax seed allergy have been described in the literature. As the use of flax seed in foods becomes more prevalent, this will likely become a more important cause of allergic reactions in the future.

References

P7
Optimizing oral immunotherapy to cow milk protein: a decision analysis
Elinor Simmons1*, Myla Moretti2
1Child Health Evaluation Sciences, The Hospital for Sick Children, Toronto, ON, Canada; 2Department of Pharmacology, The Hospital for Sick Children, Toronto, ON, Canada

Methods: We used Markov transition models to compare the expected lifetime gain in quality-adjusted life years (QALYs) of OIT to CMP versus strict avoidance of CMP. Models were run for base cases of 6- to 16-year-old children with CMA requiring strict CMP avoidance. Rates of transition to the partial or full desensitization and complete tolerance states, utilities for each state, and disutilities and durations of reactions were determined from the literature. Participants progressed through the OIT states in order but could regress to an earlier state or repeat OIT.

Results: For an 8-year-old child, OIT resulted in a 0.9 QALYs gain compared with strict avoidance; this benefit increased to 1.9 QALYs for a 16-year-old. Sensitivity analysis showed that OIT became the preferred strategy within 6 years of starting OIT. The models were sensitive to the state utilities, but not to the transition probabilities between states. Probabilities of reactions had to be over 10 times the literature-based estimates for OIT to no longer be the preferred strategy. Limitations of these models included the paucity of utility measures for children with CMA and the possible under-reporting of CMA-related reactions or death.

Conclusions: For children with CMA, OIT offers improved QALYs and the benefits outweigh the risks within a few years. Determination of utilities for younger children with CMA will help to further address this question.

P8
Food allergy management from the perspective of patients, caregivers and allergists: a qualitative study
Ya S Xu1, Susan Waseeman2, Lori Connors3, Kristin Stawiarski3, Monika Kastner4
1Department of Pediatrics, McMaster University, Hamilton, Ontario, L8N 3S5, Canada; 2Department of Medicine, McMaster University, Hamilton, Ontario, L8N 3S5, Canada; 3Department of Pediatrics, McMaster University, Hamilton, Ontario, L8N 3S5, Canada; 4Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Ontario, L8N 3S5, Canada

Background: Long term management of food allergy is suboptimal [1-3]. Our study aims to provide direction for improvement, by evaluating the current state of food allergy management from the perspective of allergists, food allergic patients or their caregivers in outpatient settings in Ontario.

Table 1 (abstract P6)

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Gender</th>
<th>Multiple food allergies?</th>
<th>Food containing flax seed: symptoms</th>
<th>Skin test to flax</th>
<th>Open challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1y5m</td>
<td>F</td>
<td>no</td>
<td>granola bar: urticaria, angioedema</td>
<td>5mm</td>
<td>not done</td>
</tr>
<tr>
<td>2</td>
<td>9y</td>
<td>M</td>
<td>yes</td>
<td>muffin: oral “tingling”</td>
<td>4mm</td>
<td>oral pruritus, throat clearing</td>
</tr>
<tr>
<td>3</td>
<td>5y</td>
<td>M</td>
<td>yes</td>
<td>bread: vomiting/urticaria (two episodes)</td>
<td>7mm</td>
<td>not done</td>
</tr>
<tr>
<td>4</td>
<td>8y</td>
<td>M</td>
<td>yes</td>
<td>fruit smoothie: angioedema of lips same fruit smoothie without flax seed before and since no symptoms</td>
<td>pending</td>
<td>pending</td>
</tr>
</tbody>
</table>
Materials and methods: This two-part study included an questionnaire completed by food allergic families to explore what information they received on food allergy, their confidence around self-management, and their learning needs; and a qualitative interview with allergists to explore their perception of teaching priorities, and the challenges and strategies in food allergy management. Using convenience sampling, participants were recruited from allergy clinics across Ontario. Analyses included descriptive statistics and frequency analysis (quantitative data) and grounded theory methodology (qualitative data) [4,5].

Results: Six allergists and 92 of their food allergic families, from Toronto, Hamilton, London, Kitchener, and Kingston, participated. Key areas requiring improvement in food allergy management were identified from the survey: 33% of families were not shown how to use an epinephrine auto injector with a trainer, 57% were asked to demonstrate its use with an auto injector despite being on average at their 5th visit, and 30% felt confident about when and how to administer an auto-injector. Many newly diagnosed families did not receive sufficient information during the visit, including medic alert identification (50%) and information about support groups (21%). Interviews with allergists indicated that a key challenge was limitation in time and nursing resource.

Conclusions: Our study highlights the experiences and educational needs of 92 food allergic families in Ontario, and the challenges faced by the 6 allergists managing them. Identified gaps could be addressed through the provision of practice sessions with an auto-injector training device; and developing training materials to simulate anaphylactic reactions, which may improve patients’ confidence in self management.

References

P9 Results of patch testing with the textile colour and finish tray
Sari M Herman-Kideckel 1, 2, D Linn Holness 1, 2, 3
1Department of Medicine, University of Toronto, Canada; 2Department of Occupational & Environmental Health, St. Michael’s Hospital, Canada; 3Dalla Lana School of Public Health, University of Toronto, Canada
E-mail: sari.herman.kideckel@utoronto.ca
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P9

Background: Textile dermatitis results from exposure to a variety of agents, including dyes and fabric finishes. Patch testing with a specialized series of allergens is often used for diagnosis.

Objective: To examine the results of patch testing with the textile components on a standard screening tray, and to compare them with the results of testing with an exclusive collection of textile allergens.

Methods: We conducted a retrospective study of 41 patients with possible work-related dermatitis who were patch tested to a screening (includes textile finish and dye mix) and a textile series from 2002-2009. Demographic and clinical data were abstracted from the chart and basic descriptive analysis was performed.

Results: Seven of the 41 patients had positive reactions to textile related allergens on the screening or textile series and five were thought to be work-related. Four patients who were patch test positive with the textile series were also positive to relevant allergens on the screening series. Two patients with work-related textile dermatitis were patch test positive to the textile series but negative to the screening series. One case related to fabric finishes and one to the dyes. In an additional work-related case, there was a positive reaction to Disperse Blue Dye 106/124 mix on the screening series, with no positive reactions on the textile series.

Conclusions: Clinically relevant work-related allergic contact dermatitis to textile allergens may be missed if only a screening series is used.

P10 Comorbidity with depression and overweight in children with asthma
Salma Bahreinian 1, Geoff DC Baill 2, Allan B Becker 3, Anita L Kozinsky 1
1Dept Pediatrics, Faculty of Medicine & Dentistry, University of Alberta, Edmonton, Alberta, Canada, T6G 2J8; 2Dept Pediatrics and Child Health, Faculty of Medicine, University of Manitoba, Winnipeg, Manitoba, Canada, R3A 1S1
E-mail: bahrein@ualberta.ca
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P10

Background: In Canada 16.6% of children are affected by asthma [1] which may increase the risk of comorbid depressive disorders in the adolescent years [2,3]. Overweight is more prevalent in children suffering from asthma [4] or depression [5], yet few studies have explored the possible relationships between these three chronic conditions in children. We examined whether depression was more prevalent in children with asthma, especially among those who were overweight.

Materials and methods: Data were collected as a part of the nested case-control study of the Study of Asthma, Genes and Environment (SAGE) cohort in Manitoba. All the children enrolled in the study at age 7-10 were reassessed by a pediatric allergist at 11-13 years to confirm asthma/atopy diagnosis. At the same visit, height and weight were obtained. Depressive symptoms were also assessed using the short form of the children’s depression inventory (CDI-S). Depression was defined as CDI-S scores ≥2 (highest quartile of population under the study). Overweight was defined as BMI-z score > 1.04. Data were analyzed using logistic regression modeling to determine likelihood of depression in children with asthma, stratified by sex and adjusting for age, overweight and atopy.

Results: A total of 485 children at 11-13 years (150 asthmatics and 335 non asthmatics) were enrolled in the study (Table 1). There was no statistically significant difference in overweight between children with versus without asthma (p=0.4) and we found the prevalence of depression to be similar among those with (33.8%) versus without (28.1%) asthma (p=0.2). Overweight was associated with higher odds of depression in girls independent of age and asthma/atopy status (adjusted odds ratio 1.94 [1.01 to 3.71]).

Table 1 (abstract P10) Basic distribution of study variables

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Overweight*</td>
<td>31.8%</td>
<td>68.2%</td>
</tr>
<tr>
<td>Asthma</td>
<td>30.9%</td>
<td>69.1%</td>
</tr>
<tr>
<td>Atopy**</td>
<td>53.2%</td>
<td>46.8%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>55.9%</td>
<td>44.1%</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Overweight: BMI-z score > 1.04
** Atopy: positive skin prick test to at least one common allergen

Table 2 (abstract P10) Likelihood of depression in children

<table>
<thead>
<tr>
<th>Adjusted OR (95% CI)</th>
<th>Overweight</th>
<th>Asthma</th>
<th>Atopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>2.1 (1.02 to 4.22)</td>
<td>0.92 (0.46 to 1.84)</td>
<td>1.07 (0.56 to 2.04)</td>
</tr>
<tr>
<td>Boys</td>
<td>1.28 (0.69 to 2.37)</td>
<td>1.94 (1.01 to 3.71)</td>
<td>0.66 (0.36 to 1.24)</td>
</tr>
</tbody>
</table>

* Adjusted for overweight, asthma, atopy and age
Odds ratio (OR)=2.1, 95% CI=1.02 to 4.22). In addition, asthmatic boys were more likely to experience depression after adjusting for age, overweight and atopy (adjusted OR=1.94, 95% CI=1.01 to 3.71) (Table 2).

Conclusions: Overweight appears to be an important predictor of depression in girls regardless of their asthma status. Although asthma status does not increase the likelihood of depression in girls, it appears to increase the odds of depression among boys.

Acknowledgments: This research was funded by AllerGen NCE Inc and the Canadian Institutes of Health Research: new emerging team and/or Immunotherapy, not only to treat allergic rhinitis symptoms but also to prevent development of allergic asthma. Further studies to establish the correlation between allergic rhinitis and cockroach sensitization are needed.

P12

Prevalence of mesquite (prosopis species) allergy and efficacy of conventional allergen specific Immunotherapy (ASIT) to mesquite in Egyptian patients with perennial allergic rhinitis (PAR)

Farag I Farag-Mahmood1,2, Waheed Hessam1, Khalil A Khalili1
1Allergy/Immunology Unit, Faculty of medicine, Suez Canal University, Ismailia 41111, Egypt; 2Omega Laboratories ltd Montreal, QC H3M 3E4, Canada
E-mail: faragil12@yahoo.com
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P12

Background: Mesquite is a genus of leguminous spiny trees and shrubs abundant in the tropical and subtropical deserts. Mesquite pollen is a potent allergen capable of inducing allergy in susceptible individuals living remote from the plant source. This study was conducted on 200 PAR patients in the Suez Canal region of Egypt to determine the prevalence of mesquite allergy and to assess the efficacy of conventional ASIT in these patients.

Subjects, materials and methods: Two hundred adult PAR patients were evaluated by allergy prick skin testing (PST) against a panel of 15 different aeroallergens including mesquite. Patients exhibiting a positive PST response to mesquite only were subjected to mesquite conventional subcutaneous ASIT. All reagents were purchased from Omega Laboratories, CANADA. Informed consents, symptom and medication scores were obtained before and after ASIT.

Results: Eighty six patients exhibited a positive PST response to mesquite allergen. Out of these 38 patients were positive to mesquite allergen only. Significant improvement in symptom and medication scores were detected in 24/38 patients 4 months after the initiation of ASIT.

Conclusions: Mesquite pollen allergy is common among Egyptian PAR patients and ASIT with mesquite extract can reduce the burden of the disease in these patients.

P13

The utility of using fiberoptic endoscopy in the diagnosis of nasal polyps

Ruth Ko1, M. Cottrill2, HK Kim2,3
1University of Waterloo, Canada; 2University of Western Ontario, Canada; 3McMaster University, Canada
E-mail: ruthetteko89@gmail.com
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P13

Background: Nasal examination is important in assessing patients with rhinitis. Most allergists examine the nose using an otoscope (OT). Most do not perform fiberoptic rhinoscopy (FR). The purpose of this study is to determine the sensitivity for identifying nasal polyps (NP) with OT examination using FR findings as the gold standard.

Materials and methods: This study was performed in a referral allergist’s practice in Ontario. In a prospective study, all patients with rhinitis symptoms had OT examination and FR. Patients who had NP identified with FR were included in the study. The findings of the OT examination were compared to the FR findings. Other data collected included allergy skin test results, presence of asthma, aspirin allergy, previous nasal surgeries, intranasal corticosteroid (INS) use and leukotriene receptor antagonist (LTRA) use.

Results: Eighty six patients were identified to have NP with FR. Forty nine patients (57%) had NP identified by OT examination. Forty (47%) of patients with NP had positive skin tests for at least one aeroallergen. Fifty-nine (68%) had asthma, 13 (15%) had an ASA allergy and 10 (12%) had both conditions. Forty-eight (56%) were using an INS and 9 (10%) were on LTRA. Thirty-four (40%) had previous surgery.
Conclusions: The OT examination had a 57% sensitivity. Therefore, in this study, 43% of patients with nasal polyps would have had their nasal polyps missed if FR was not performed.

P14

Allergic rhinitis in the primary care setting: patient practice reflective
Peter Small1*, Remi Gagnon2, Harold Kim3, Renata Rea4, Nazli Topors4
1Department of Medicine, Jewish General Hospital, McGill University, Montreal QC, Canada; 2Centre Hospitalier de l’université Laval, Québec QC, Canada; 3University of Western Ontario, London, ON, Canada and McMaster University, Hamilton, ON, Canada; 4GlaxosmithKline Inc, Mississauga, ON, Canada
E-mail: psmall@jgh.mcgill.ca
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P14

Background: Allergic rhinitis (AR) is a multifaceted condition affecting up to 40% of the population. AR leads to nasal symptoms of congestion, rhinorrhea, sneezing, and nasal itching. It is often associated with ocular symptoms of itching/burning, tearing/watering and redness. AR has a negative impact on patients’ quality of life (QoL) due to both nasal and ocular symptoms. Market research showed that Canadian physicians believe only 44% of their seasonal allergic rhinitis (SAR) patients suffer from ocular symptoms. The objective of the program was to better understand the symptom severity and impact on QoL of SAR patients in Canada.

Materials and methods: A national survey in SAR patients 12 years and older was conducted from March-June 2010. A total of 3564 questionnaires were completed. Patients were identified by their primary care physician and asked to complete a questionnaire consisting of 13 questions regarding their SAR. The program was self-conducted and no patient names were provided.

Results: This national survey found that 77% of patients with SAR reported experiencing both ocular and nasal symptoms. Furthermore, 77% of patients reported sleep interference, 69% avoided typical daily activities and 29% missed work or school due to SAR symptoms. When asked about how well their allergy symptoms were controlled, 27% responded as mostly controlled and only 3% had full control.

Conclusions: Ocular symptoms are common in patients with SAR. Both Ocular and nasal symptoms have an impact on the QoL of AR sufferers. SAR patients have poorly controlled nasal and/or ocular symptoms.

P15

Altered gastrointestinal mucosal permeability in asthma
John Walker1*, D Mah2, Kyunh Park1, L Deileman2, J Meddings1,
DP Vethanayagam1
1Department of Medicine and Pulmonary Research Group, University of Alberta, Edmonton, Alberta, Canada; 2Department of Medicine, University of Calgary, Calgary, Alberta, Canada
E-mail: jwalker@ualberta.ca
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P15

Background: Abnormal gastrointestinal permeability (GIP) has been implicated in immunologic disease, including Crohn’s disease and celiac disease, but also including non-intestinal diseases such as diabetes and multiple sclerosis. Abnormal GIP may lead to entry of allergens from the gut into the systemic circulation and may prime the immune system, inciting inflammation outside the gut.

Hypothesis: Adult asthmatics demonstrate abnormal small bowel GIP.

Methods: GIP in ten patients followed in a regional referral centre in Northern Alberta was assessed. Patients were classified as allergic versus non-allergic on the basis of skin allergen testing. GIP was evaluated using an assay with established normal range values. Patients ingested a solution containing sucrose, mannitol and lactulose and urine was collected and assayed using high-performance liquid chromatography. Retrospectively, patient records were reviewed, and in addition to demographics, airway physiology, atopy, and sputum cell counts (SCCs) were captured.

Results: 5 of 10 patients had increased GIP (Figure 1). Patients with abnormal GIP were not more likely to have evidence of active airway inflammation as assessed by SCC. There was no association between atopy and abnormal GIP.

Discussion: This study demonstrates an increase in GIP in the MALT-rich small intestine of asthmatic patients, illustrating an association between abnormal GIP and current asthma. Abnormal GIP did not correlate with concurrent airway inflammation. Abnormal GIP may be an important determinant of allergenic entry into the systemic circulation, and the absence of a correlation between active airway inflammation and increased GIP suggests a primary defect in the immunologic barrier.

P16

Efficacy and safety of combined medium-dose mometasone furoate/formoterol (MF/F) in persistent asthmatics
Robert A Nathan1*, David S Pearlman1, Hendrik Nolte1, Anjuli Nayak1
1Allergy and Asthma Associates, P.C., Colorado Springs, CO, 80907, USA; 2Colorado Allergy and Asthma Centers, P.C., Denver, CO, 80230, USA; 3Merck Research Laboratories, Kenilworth, NJ, 07033, USA; 4Sneeze, Wheeze, and Itch Associates, Normal, IL, 61761, USA
E-mail: DrRNathan@aol.com
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P16

Background: The availability of controller therapies at multiple strengths is important to treat different severities of asthma (NHLBI and GINA guidelines). The clinical effect of medium-dose mometasone furoate/formoterol (MF/F) combination administered via single inhaler had never been characterized in asthmatic subjects versus placebo. We investigated
the effect of medium-dose MF/F administered via an MDI on asthma deteriorations (ie, severe exacerbations) and pulmonary function in moderately-severe asthmatics inadequately-controlled on medium-dose inhaled corticosteroids (ICS) ± long-acting β2-agonists (LABA).

Materials and methods: After 2-3-weeks open-label run-in with MF 200μg BID, subjects (≥12 years) were randomized to 26-weeks treatment BID with MF/F 200/10μg, MF 200μg, F 10μg, or placebo. Co-primary endpoints were time-to-first asthma deterioration over the treatment period (MF/F vs F), and the area under the curve (AUC) of the change in serial FEV1 [0-12 hr] to Week 12 (MF/F vs MF).

Results: 781 subjects (mean age: 42.4 y, asthma duration: 16.07 y, FEV1 % predicted: 72.62%, reversibility: 18.80%, ACQ score: 1.51) were randomized. MF/F increased the time-to-first asthma deterioration and decreased the proportion of subjects who experienced asthma deteriorations (MF/F=30.4%; MF=33.9% [p=0.565]; F=54.0% [p<0.001]; placebo=55.6% [p<0.001]). MF/F treatment improved lung function more than MF within 5 minutes following administration (p<0.001); mean Week-12 FEV1, AUCFEV1 (L × h over baseline): MF/F=3.11, MF=1.30, F=1.93, and placebo=0.57 (effect was maintained throughout the treatment period). Adverse events were rare and similar across treatment groups.

Conclusions: MF/F 200/10μg was more effective in reducing asthma deteriorations and improving lung function in asthmatics uncontrolled on medium-dose ICS±LABA than placebo, MF or F.

P17 The association between neighborhood stressors and asthma prevalence of school children in Winnipeg
Tyler P Pittman1, Anika L Kozynski1, Allan B Becker2
1Department of Pediatrics, University of Alberta, Edmonton, Alberta, Canada;
2Department of Pediatrics & Child Health, University of Manitoba, Winnipeg, Manitoba, Canada
E-mail: tpp@ualberta.ca
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P17

Background: Neighborhood stressors have an incubating effect for a variety of diagnoses on maternal and child health [1]. It is of interest to determine if the Odds of asthma prevalence is greater amongst children of chronic stress neighborhoods, after adjusting for covariates such as family history of asthma and socioeconomic status. Winnipeg, Manitoba is used as study location with the urban component of children resident of birth home (698 responses) extracted from the Study of Asthma, Genes and the Environment (SAGE) Survey administered in 2002-2003 to a birth cohort from 1992 [2].

Results: The Odds Ratio of asthma amongst children residing in census tracts for the fourth and fifth quintiles of proportion males age 15+ and unemployed was 77.8% (OR: 0.222, p-value: 0.001) and 63.9% (OR: 0.361, p-value: 0.020) lower, respectively, than asthma prevalence in the lowest proportion of males age 15+ and unemployed quintile. Additionally, Odds of asthma for residents of the fourth highest quintile census tracts of labor force participation age 15+ was over two and half times (OR: 2.645, p-value: 0.011) greater than that of children residing in the lowest quintile. From the 2001 Winnipeg Police Service Crime Data, children of profile Downtown East with the highest theft over $5,000 crime rate had 2.44 (OR: 1.088 per unit change, p-value: 0.039) greater Odds of asthma than those in profile River Heights East with the lowest crime rate.

Conclusions: Children from neighborhoods assigned low SES scores by compositional stressors obtained from the 1996 Canada Census were found to have a decreased Odds of parent report of asthma. However, children resident of neighborhood profiles with high contextual stressor crime rates obtained from the Winnipeg Police Service Crime Data, 2001 had increased Odds of asthma. The effect of neighborhood was attributable to small proportion of variance in asthma report.

References

P18 Prevalence of allergic sensitization to Russian thistle in Kingston and the South-eastern Ontario catchment area; a retrospective chart review
Nina Lakhan1, Anne K Ellis2, Salahaddin Mahmudi-Azer2
1Department of Medicine, Queen’s University, Kingston, ON, Canada;
2Department of Microbiology & Immunology, Queen’s University, Kingston, ON, Canada
E-mail: nina.Lakhan@queensu.ca
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P18

Background: Russian thistle has only recently been identified as a potentially clinically important allergen. In the third phase of the National Health and Nutrition Examination Surveys conducted in the USA (1988 to1994) over 15% of tested individuals had positive skin-test responses to this extract. The rate of skin test positivity to Russian thistle in Canada is unknown.

Objective: To determine the prevalence of skin test positivity to Russian Thistle in patients from Kingston and the Southeastern Ontario catchment area, and the possible clinical significance of the same.

Methods: A retrospective chart review was performed to document the rate of sensitization amongst tested patients to Russian thistle extract (Hollister-Steir). Only patients with appropriate histamine responses were included. We collected demographic data in addition to the presence/absence of relevant clinical symptoms.

Results: Of 410 charts reviewed, 170 underwent skin testing to Russian thistle. Of these, 17(10%) were positive. Of the test-positive cohort, 47% (8/17) had symptoms that correlated seasonally with the predominant Russian thistle pollen season (August-October). The mean age of skin-test positive individuals was 35.2 years. 82% and 52.9% of these had concomitant positive skin tests to ragweed and birch, respectively, allergens with known cross-reactivity.

Conclusions: This preliminary evaluation suggests that the prevalence of skin test positivity to Russian thistle in the studied area is approximately 10%, with about half of these individuals reporting correlative seasonal symptoms. Including Russian thistle in routine skin testing panel may better establish the clinical significance of this environmental allergen. This study was approved by the Queen’s University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board, with no financial interest or funding provided.

P19 Redefining eosinophil crystalloid granules as a potential new functional unit in extracellular inflammatory Events
Salahaddin Mahmudi-Azer1, Peter F Weller2, Ann M Dvorak3, Redwan Moqbel4, Peter D Paré5
1From Department of Medicine, University of Calgary, Alberta, Canada;
2Departments of Medicine and Pathology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA;
3Department of Immunology, University of Manitoba, Faculty of Medicine, Winnipeg, Manitoba, Canada;
4The James Hogg (CAPTURE Centre, St. Paul’s Hospital, Dept. of Medicine, University of British Columbia, Canada
5Harvard Thorndike Laboratory and Charles A. Dana Research Institute, Departments of Medicine and Pathology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA;
6Harvard Medical School, Boston, MA 02215, USA
E-mail: sazer@shaw.ca
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P19

Eosinophils are major effector cells in allergic inflammatory response. They are known to synthesize, store, and release a wide range of pro-inflammatory mediators. Eosinophils contain different populations of mediator-storage organelles, including small secretory vesicles as well as crystalloid granules. In cytolysis, eosinophil cell membrane loses its integrity and crystalloid granules are released to extracellular space. Potential function of crystalloid granules in extracellular space as it relates to inflammatory events remains widely unknown. We hypothesized that eosinophil crystalloid granules are equipped to function independently in extracellular space. Our findings indicate that both DNA and RNA localize to human and rabbit eosinophil crystalloid granules and that RNA seems to be synthesized in intra-granular space further suggesting the presence of functional transcription machinery inside the granules. Furthermore, we show here that crystalloid granules...
express functional membrane receptors for a cytokine, IFNgamma, as well as G protein-coupled membrane receptors for a chemokine, eotaxin. Our findings indicate that these receptors function by activating signal-transducing pathways within granules leading to mediator release from granules to extra-granular space in a cell free environment. Taken together our findings define a new potential role for eosinophil crystalloid granules as independent extracellular functional units in inflammatory events and may reveal a novel target in modulating the inflammatory events.

P20
Molecular and morphological characterization of piecemeal degranulation in human neutrophil azurophilic granules
Salahaddin Mahmudi-Azer1, Peter F Weller2, Ann M Dorovak3, Redwan Moqeib3, Peter D Pare3
1From Department of Medicine, University of Calgary, Alberta, Canada; 2Harvard Thrombode Laboratory and Charles A. Dana Research Institute, Departments of Medicine and Pathology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA; 3Department of Immunology, University of Manitoba, Faculty of Medicine, Winnipeg, Manitoba, Canada.

Methods: Mediators pre-stored in neutrophil azurophilic granules are central to the acute inflammatory response and tissue degradation and damage through their proteolytic activity. Different granule populations mobilize and release their content via distinct and hierarchical molecular mechanisms. The molecular mechanisms by which mediators pre-stored in azurophilic granules are mobilized and released to the extracelluar space remain largely unknown. We used a number of complementary techniques including; confocal laser scanning microscopy, subcellular fractionation, flow cytometric analyses, Western blot analyses and electron microscopy to examine the ultrastructural and molecular nature of mediator release in neutrophil azurophilic granules. We found that following IL-8 activation, neutrophil azurophilic granules undergo piecemeal degranulation (selective mediator release) leading to altered granule content. Piecemeal degranulation of azurophilic granules is characterized by budding of small secretory vesicles and consequent reduction in granule density. Furthermore, budding of small secretory vesicles and selective mediator mobilization and release from azurophilic granules is associated with reduced localization of CD63, Hck and beta-arrestin-1 to granule membranes and also cell surface upregulation of these molecules. Our study is first to identify piecemeal degranulation as a potential underlying mechanism of mediator release from neutrophil azurophilic granules and supports the involvement of CD63, Hck, and beta-arrestin-1 in this process.

P21
Expression of nitric oxide synthase in nasal polyps
Tsuyoshi Yoshimura1,2, Tae Chul Moon1, Chris St Laurent1, Lakshmi Puttagunta1, Erin Wright1, A Dean Befus1
1Pulmonary Research Group, Department of Medicine, University of Alberta, Edmonton, AB, Canada; 2Department of Laboratory Medicine and Pathology, University of Alberta Hospitals, Edmonton, AB, Canada.

Background: Nitric oxide (NO) is a short-lived, reactive molecule generated by nitric oxide synthase (NOS). Three isoforms of NOS have been identified including: neuronal NOS (NOS1), endothelial NOS (NOS3) and inducible NOS (NOS2). Objective: To identify expression of isoforms of NOS in nasal polyps (NP) and normal nasal tissue, and to determine if differences exist in NOS expression in NP rich in eosinophils (Eo-hi) or with few eosinophils (Eo-low).

Methods: NP were obtained after endoscopic surgery for chronic rhinosinusitis, and separated into two categories based on eosinophil density. Nasal middle turbinates (MT) were also collected as normal controls from patients who had undergone surgery for pituitary adenomas. To identify cell types expressing isoforms of NOS, double immunostaining was performed using anti-NOS and anti-leukocyte antibodies (e.g. mast cells [MC], eosinophils, T cells and macrophages).
Results: Expression of NOS isoforms in all cell types was greater in NP than in MT. Number of NOS2 positive cells in Eo-hi NP was higher than in Eo-low NP. However, there were no differences in the numbers of NOS1 and NOS3 positive cells between Eo-hi and Eo-low NP. Both NOS2 positive MC and NOS2 positive Eo were significantly greater in NP than in MT. In addition, the percentage of NOS2 positive MC in Eo-hi NP was significantly higher than in Eo-low NP.
Conclusion: Elevation in NOS2 expression in several cell types might be an important factor in the life history of NP, especially those with an abundance of eosinophils.
expressed strongly in terminally differentiated B cells, such as memory and plasma cells.

**Experiment and results:** B cells were purified from tonsils removed from children undergoing routine tonsillectomy. They were cultured for 24 hours or 7 days at a concentration of 5X10^4 cells/mL in complete medium in the presence of aCD40 with either IFNγ, IL-4, IL-21 or both IL-4 and IL-21. RNA was extracted, CDNA was made, and SEMA4C mRNA was amplified by qPCR and compared to the housekeeping gene GAPDH. After 24h culture, SEMA4C mRNA expression was detected only in IL-4-stimulated cells but after 7 days, the expression was much stronger in both conditions containing IL-21, and decreased in IL-4-only stimulated cells.

B cells were also similarly cultured for 72 hours at a concentration of 0.5X10^6 cells/mL in chamber slides. Slides were stained for SEMA4C with a fluorescent Alexa488 antibody and then visualized using fluorescent microscopy. As expected, stimulation with IL-21 yielded much higher SEMA4C expression than IL-4 alone whereas IFNγ did not induce significant staining, Figures 1 and 2.

**Conclusion:** SEMA4C is induced in B cells upon Th2 stimulation but increases further upon follicle-like differentiation triggered by IL-21. This data confirms that SEMA4C is specific to terminally-differentiated B cells and supports our hypothesis that it might play a role in B-cell trafficking and homing in peripheral tissue follicles. SEMA4C could therefore be a key player in local allergic inflammation.

---

**P24**

**Expression and roles of glutamate (NMDA) receptors on T cell subsets**

Kanami Orihara 1*, Solomon O Odemuyiwa 2, Nyla D1, Vidyanand Anaparti 1, Redwan Moqbel 1

1Department of Immunology, Faculty of Medicine, University of Manitoba, Winnipeg, MB, Canada, R3E 0T5; 2Pulmonary Research Group, University of Alberta, Edmonton, AB, Canada, T6G 2S2

E-mail: oriharak@cc.umanitoba.ca

*Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2): P24*

**Rationale:** Tryptophan is an essential amino acid and its oxidative catabolism, through the action of its rate-limiting enzyme, indoleamine 2,3 dioxygenase (IDO), generates functional molecules in neurons. We studied the function of the tryptophan catabolism pathway on immune regulation. We have shown previously that human eosinophils constitutively express bioactive IDO and that co-culture of eosinophils with T-helper cells resulted in Th1-, but not Th2 apoptosis and inhibited proliferation. IDO-mediated tryptophan catabolism results in bioactive kynurenines (KYNs). Since KYNs exert their effect on neurons via glutamate-mediated cell death (excitotoxicity) that targets NMDA (N-methyl-D-aspartate) glutamate receptors (NMDA-Rs), we examined NMDA-R phenotype and function in Th1 vs. Th2 immune regulation.

**Materials and methods:** Naïve CD4 T cells were separated from PBMCs and differentiated to Th1 and Th2 using established methods. Expression of NMDA-Rs was detected using reverse transcript PCR, real-time PCR, Western blotting and flow cytometry. T cell proliferation and apoptosis were assessed by [mitotic index] and [apoptosis rate].

---

**Figure 1 (abstract P23)** Relative expression of SEMA4C mRNA over GAPDH in stimulated tonsillar B cells (N=5).

**Figure 2 (abstract P23)** Immunofluorescent staining at 10X magnification for SEMA4C in B cell cultures is associated with “follicle-like” clones.
was detected by CSFE- and Annexin V-staining, respectively. We measured Ca\(^{2+}\) flux by Fluo-3 and Fura Red.

**Results:** We determined the presence of RNA and protein expression of metabolic glutamate receptors on all T-helper cell subtypes using 7 NMDA-R documented subtypes. Apoptotic and anti-proliferative effects of KYNs were exerted on Th1, but not Th2, as was KYN-induced Ca\(^{2+}\) flux. These effects were significantly inhibited with the specific NMDA-R competitive inhibitor, MK-801.

**Conclusion:** These findings suggest that NMDA-Rs on T cells may play an important role in promoting Th2 polarization in allergies and reduction of Th1 cell resulting in Th2 bias in allergy.

**P25**

The seven-transmembrane receptor, C5L2, is a stimulatory receptor on human mast cells

**Background:** Complement anaphylatoxin 5a (C5a) is a powerful inflammatory mediator involved in the pathology of inflammatory diseases as chronic idiopathic urticaria. C5a binds to two receptors, C5aR, a G protein-coupled receptor, and C5L2, a 7-transmembrane receptor deficient in G protein coupling. The role of C5L2 in human mast cells (huMC) is unknown. We hypothesized that huMC express C5aR and/or C5L2 and C5a activates huMC to produce pro-inflammatory mediators through one or both of these receptors.

**Methods:** C5aR and C5L2 expression on the huMC line, LAD2, was analyzed by quantitative PCR and flow cytometry. Degranulation was measured by histosaminidase assay. Eicosanoids and cytokines/chemokines production was measured by ELISA and cytometric bead array. C5L2 expression was knocked-out using C5L2 shRNA lentiviral particles (LvP) and a stably C5L2- cell line was selected for further analysis of C5L2 function.

**Results:** LAD2 expressed mRNA for C5aR and C5L2. However, flow cytometry analysis showed that LAD2 expressed surface C5L2 but not C5aR. C5a stimulated LAD2 to produce TNF (22±1.3pg/ml), GM-CSF (15±0.4pg/ml), MCP-1 (53±3.6pg/ml) and IP-10 (32±4.3pg/ml). C5a failed to degranulate LAD2 and generate eicosanoids. C5L2 shRNA LvP completely knocked-out C5L2 expression. C5L2-depleted LAD2 did not respond to C5a while control shRNA-treated LAD2 did.

**Conclusions:** LAD2 express C5L2 but not C5aR, and C5a induces production of cytokines/chemokines suggesting that C5L2 is an excitatory receptor in huMC. Knock-down of C5L2 abrogates C5a function. This is the first study to demonstrate a functional role of C5L2 in huMC. The observation that C5L2, not C5aR, may be more important in complement-mediated activation of huMC may provide novel insights into treatment of complement-mediated inflammation.

**P26**

Reproducibility of cell counts in nasal lavage: a comparison of pooled versus non-pooled nasal lavage samples

Dominik A Nowak1, Penelope Fene2, Paul K Keith2

1University of Toronto Mississauga, Mississauga, Ontario, Canada, L5L 1C6, 2McMaster University, Hamilton, Ontario, Canada, L8S 4L8

**Background:** Nasal lavage is used to collect cells and inflammatory mediators from the nasal cavity. No universal method for nasal lavage exists and there is little evidence as to which method is most reproducible or reflective of tissue inflammation.

**Objective:** To compare the reproducibility of a single lavage versus three pooled lavages.

**Methods:** Randomized crossover trial of 7 perennial allergic rhinitis, 7 nasal polypl, and 7 control subjects. Two visits with single lavage and two with pooled lavage in alternating order were performed 7 to 10 days apart using a modified Naclerio method.

**Results:** A higher mean cell count was obtained using pooled lavage (means of 342 and 304 vs. 243 and 246, p<0.00004). The mean eosinophil percentage was comparable for both methods (for >100 cell count samples, 7% and 4% for single compared to 5% and 5% for pooled lavage, p=0.2). Single sample lavage produced a higher intraclass correlation (ICC) for eosinophil percentage (0.695 vs. 0.583). A cutoff of 100 total cells gave the most reproducible eosinophil % with ICC of >0.8. The ICC was 0.87 for single sample lavage and 0.81 for pooled lavage with >100 and 0.671 for SSL and 0.535 for MSL with ≥20 cells. Neutrophil (p=0.2), lymphocyte (p=0.2), monocyte (p=0.2), or basophil (p=0.3) percentages were not significantly different.

**Conclusion:** Although the total cell counts were lower, single sample lavage was comparable in measuring inflammatory cells. The intraclass correlation of the eosinophil percentage in single lavage was higher than pooled lavage perhaps due to a wash out effect from multiple lavages.

**P27**

Adrenal suppression in an asthmatic presenting after change from high dose inhaled fluticasone propionate to inhaled budesonide

Zainab B Abdurahman1, Douglas P Mack2

1Dept of Clinical Immunology and Allergy, McMaster University, Hamilton, ON, Canada; 2Dept of Pediatrics, McMaster University, Hamilton, ON, Canada

**Introduction:** Adrenal suppression with high doses of inhaled corticosteroids has been reported in the literature with suggestion of fluticasone propionate (FP) being a more potent adrenal suppressant than budesonide (BUD). To our knowledge, we present the first case of adrenal suppression after change from high dose FP to BUD therapy.

**Case description:** A ten-year-old boy with asthma, peanut allergy, and allergic rhinitis had been maintained on a regimen of FP/salmeterol 500 mcg per day and mometasone furoate nasal spray 50 mcg per day. During exacerbations FP 500 mcg per day was added. He had no oral steroid usage. After a stable period with only FP/salmeterol, his regimen was changed to BUD/formoterol 800 mcg per day. Shortly after this change in regimen, he began to experience spells of dizziness, fatigue, nausea and diaphoresis with exercise. A random glucose was low at 3.4 mol/l and an AM cortisol was low at 67 nmol/L. With endocrinologist recommendation adrenal suppression was diagnosed, hydrocortisone therapy at 18 mg/m2 and ciclesonide were initiated. He is currently stable, tapering hydrocortisone therapy, with plans for ACTH stimulation test when hydrocortisone is discontinued.

**Discussion:** A number of studies have suggested that the systemic bioavailability and potential for adrenal suppression is increased with FP compared to BUD. It is our suspicion that his underlying adrenal suppression was revealed presenting as withdrawal after switching to a less bioavailable steroid. Adrenal suppression is an important consideration for physicians tapering patients from chronic high dose fluticasone therapy to less bioavailable inhaled corticosteroids.

**P28**

Case report of treatment with icatibant for recurrent throat swelling due to hereditary angioedema

Arthur G Chung1, Paul K Keith2

1200 Main St. W. Hamilton Ontario L8N 3Z5, Canada

**Introduction:** Icatibant is a selective inhibitor of bradykinin B2 receptor indicated for the acute treatment of hereditary angioedema (HAE) attacks. In a case of a 64 year-old woman with longstanding hereditary angioedema who previously required a tracheotomy, we report a novel use of icatibant for acute treatment of hereditary angioedema.

**Case description:** In September 2005, while receiving prophylactic Danazol she noticed a left sided swelling involving her throat and uvula that was of moderate severity. In January 2006, she underwent a clinical diagnosis of hereditary angioedema and was started on prophylactic Icatibant. She has been successfully treated with Icatibant for several acute attacks. She continues to require prophylactic Icatibant for maintenance therapy.
intensity by 1100h. She came to hospital and received icatibant 30 mg sc at 1330h when the swelling was 1 cm in size. One hour later the swelling was 4 mm in size. After 2 hours the swelling was gone and did not recur. Because of increased frequency of angioedema, after December 2008 she started taking C1 esterase inhibitor 2000 IU once weekly, and Danazol 400 mg daily plus additional C1 inhibitor infusions when symptoms were uncontrolled. She received icatibant in August 2009 for throat swelling. Her symptoms subsided and admission wasn’t required. In November 2009, she was admitted for a bowel obstruction due to angioedema. She received a single dose of icatibant, but did not note any benefit. Treatment with icatibant was not repeated. With conservative treatment and additional C1 esterase inhibitor, her bowel obstruction gradually resolved over 3 days. Her C4 was undetectable (<0.02 g/L) and C1 esterase inhibitor was within the normal range (0.22 g/L normal 0.21-0.39 g/L). We present a patient with hereditary angioedema whose throat angioedema responded to icatibant but a single dose of icatibant did not have significant effect on bowel angioedema. Physicians should consider icatibant for breakthrough attacks not prevented by prophylactic therapy.

P29

Prolonged elevation of serum tryptase resulting from intraoperative anaphylaxis to methylene blue

Sacha Oomah1, Tom Dembinski2, Allan Becker3, Chrystyna Kalicinsky1,4
1 University of Manitoba, Winnipeg, Manitoba, Canada, R3E 3PS; 2 Diagnostic Services of Manitoba, Winnipeg, Manitoba, Canada, R2H 2A6; 3 Allergy and Clinical Immunology, Health Sciences Center, Winnipeg, Manitoba, R3A 1R9
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2)P29

Background: Intraoperative anaphylaxis during sentinel lymph node biopsy is a well known phenomenon occurring with administration of patent blue and isosulfan blue dyes, with an incidence of 2.2% and 1.1%, respectively [1,2]. Methylene blue has been reported as being a safer alternative with only a few case reports demonstrating anaphylaxis and large studies demonstrating no incidence of anaphylaxis in 224 patients [3,2].

Case report: A 62 year old female undergoing sentinel lymph node biopsy and right lumpectomy was administered methylene blue alongside anaesthetics. Two minutes after administration of methylene blue, the patient entered anaphylactic shock with hypotension, discoloration, and angioedema. Fluid, steroids, and vasopressors were administered and the patient stabilized, at which point the operation continued. Serum taken an hour after anaphylaxis demonstrated a tryptase of 34 ng/ml. A sample six hours later demonstrated prolonged elevation of tryptase at 58 ng/ml. A baseline sample was within normal limits (<12 ng/ml) at 3 ng/ml. Skin prick and intradermal testing was negative for penicillin, ancef, latex, rucuronium, and propofol. Intradermal testing, however, was positive for methylene blue at 1/10, although a non-irritating concentration has yet to be established.

Discussion: Serum tryptase peaks at one to two hours post anaphylaxis with a subsequent half-life of two hours [4]. We demonstrate tryptase levels that increase with time, rather than decrease, subsequent to exposure to methylene blue. Serum tryptase levels in response to methylene blue anaphylaxis have not been reported previously.

Conclusion: Methylene blue can cause anaphylaxis with a prolonged elevation of serum tryptase levels.

References
intravenous methylprednisolone, and his symptoms improved soon after. The total duration of serum sickness-like symptoms was about 2 weeks.

Conclusions: We believe this is the first description ever of serum sickness-like reaction to meropenem and imipenem, other than a single case report of a 34-year old adult who had a serum sickness-like reaction to meropenem [1].

Reference

P32
A shared voice: engaging First Nations and Inuit communities in the development of culturally appropriate asthma and allergy education materials and resources for youth and their families
Oxana Latycheva, Christine Hampson, Mark Greenwald, Sabrina Panetta, Rupinder Chera
The Asthma Society of Canada, Toronto, Ontario, Canada, M2N 6K1
E-mail: dmmarkgreenwald@rogers.com
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P32

Background: The prevalence of asthma and associated allergies is higher in First Nations and Inuit communities than in the general Canadian population. The main project purpose was to assess the relevance of existing asthma education materials and resources to First Nations and Inuit communities, and identify how these materials could be adapted to be culturally appropriate.

Materials and methods: Three sources of data were used to compile the findings. First, 68 asthma assessment packages and questionnaires were completed by Aboriginal community members. Second, five webinars with 56 participants in total were conducted. Third, an Advisory Group was created to discuss potential barriers to receiving asthma education.

Results: Aboriginal community members valued interactivity, visual features of materials, and personal interaction. Newly developed materials should focus on practical and lifestyle issues of asthma management. Participants also preferred a combination of traditional printed and digital resources. Cultural relevance could be improved by including images related to Aboriginal culture, featuring personal stories, and making materials available in Aboriginal languages.

Conclusions: The findings support five key recommendations. Firstly, there should be a focus on the development of culturally appropriate asthma educational materials and resources. Secondly, implementation of asthma educational activities for children should be a priority. Thirdly, education should target broader community members to increase community awareness of asthma. A fourth recommendation is to ensure appropriate access to educational resources in the communities. Finally, it is crucial to continue engaging First Nations and Inuit community members in the development/adaptation of asthma educational materials and community-based programs.

Acknowledgements: We would like to extend our thanks to the First Nations and Inuit Health Branch (FNIIH), Health Canada for providing funds for this important project.

P33
Non-inferiority efficacy comparison of mometasone furoate/formoterol versus fluticasonepropionate/salmeterol combination therapies in subjects with persistent asthma
David I Bernstein,1, Kevin R Murphy,2, Hendrik Nolte,3
1University of Cincinnati College of Medicine, Cincinnati, OH, 45267, USA;
2Boys Town National Research Hospital, Boys Town, NE, 68130, USA;
3Allergy Medical Clinic, Research Division, Los Angeles, CA, 90025, USA
E-mail: kmurphy@boyytown.org
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P33

Background: Mometasone furoate/formoterol (MF/F) MDI combination therapy are under investigation as new treatments for persistent asthma.

Materials and methods: This randomized, active-controlled, multicenter, non-inferiority trial enrolled subjects (≥12 yrs) previously treated with medium-dose inhaled corticosteroid alone or combined with a long-acting β2-agonist. Following a 2-4 wk run-in treatment period with MF administered via metered-dose inhaler (MDI) 200 µg twice daily (BID), eligible subjects were randomized to MF/F-MDI 200/10 µg BID or FP/S-DPI administered via dry-powder inhaler (DPI) 250/50 µg BID for 12 wks. The primary endpoint was change from baseline in area under the curve in forced expiratory volume in 1 s (0-12 h postdose (FEV1AUC0-12 h)). Key secondary endpoints included onset of action, defined as change from baseline in FEV1 at 5 min postdose on Day 1.

Results: 722 subjects were randomized to MF/F-MDI (n = 371) or FP/S-DPI (n = 351). MF/F-MDI was found to be non-inferior to FP/S-DPI for mean FEV1AUC0-12 h, at endpoint (3.43 vs 3.24 Lh, respectively; 95% CI, -0.40, 0.76). MF/F-MDI’s onset of action was rapid and significantly faster than observed for FP/S-DPI (Figure 1), with a 200 mL mean increase from baseline in FEV1 at 5 min postdose (first scheduled measurement) on Day 1 for MF/F-MDI vs 90 mL for FP/S-DPI (P < 0.001).

Conclusions: This non-inferiority trial demonstrated that DPI-administered MF/F 200/10 µg BID was non-inferior to DPI-administered FP/S 250/50 µg BID in FEV1AUC0-12 h. MF/F-MDI was superior to FP/S-DPI in onset of action.

P34
Efficacy and safety of medium and high doses of mometasone furoate/formoterol (MF/F) combination treatment in subjects with severe persistent asthma
Steven F. Weinstein1*, Kevin R. Murphy2, Jonathan Coren3, Hendrik Nolte4, Martha V. White5
1Allergy and Asthma Specialists Medical Group and Research Center, Huntington Beach, CA, 92647, USA; 2Boys Town National Research Hospital, Boys Town, NE, 68130, USA; 3Allergy Medical Clinic, Research Division, Los Angeles, CA, 90025, USA; 4Merck Research Laboratories, Kenilworth, NJ, 07033, USA; 5Institute for Asthma and Allergy, Wheaton, MD, 20902, USA
E-mail: sfwoc@allergy.com
Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 2):P34

Background: Multiple strengths of mometasone furoate/formoterol (MF/F) MDI combination therapy are under investigation as new combination therapies on pulmonary function and onset of action in subjects with persistent asthma.

Materials and methods: This randomized, active-controlled, multicenter, non-inferiority trial enrolled subjects (≥12 yrs) previously treated with medium-dose inhaled corticosteroid alone or combined with a long-acting β2-agonist. Following a 2-4 wk run-in treatment period with MF administered via metered-dose inhaler (MDI) 200 µg twice daily (BID), eligible subjects were randomized to MF/F-MDI 200/10 µg BID or FP/S-DPI administered via dry-powder inhaler (DPI) 250/50 µg BID for 12 wks. The primary endpoint was change from baseline in area under the curve in forced expiratory volume in 1 s (0-12 h postdose (FEV1AUC0-12 h)). Key secondary endpoints included onset of action, defined as change from baseline in FEV1 at 5 min postdose on Day 1.

Results: 722 subjects were randomized to MF/F-MDI (n = 371) or FP/S-DPI (n = 351). MF/F-MDI was found to be non-inferior to FP/S-DPI for mean FEV1AUC0-12 h, at endpoint (3.43 vs 3.24 Lh, respectively; 95% CI, -0.40, 0.76). MF/F-MDI’s onset of action was rapid and significantly faster than observed for FP/S-DPI (Figure 1), with a 200 mL mean increase from baseline in FEV1 at 5 min postdose (first scheduled measurement) on Day 1 for MF/F-MDI vs 90 mL for FP/S-DPI (P < 0.001).

Conclusions: This non-inferiority trial demonstrated that DPI-administered MF/F 200/10 µg BID was non-inferior to DPI-administered FP/S 250/50 µg BID in FEV1AUC0-12 h. MF/F-MDI was superior to FP/S-DPI in onset of action.

Figure 1 (abstract P33) Onset of action for MF/F-MDI vs FP/S-DPI combination therapies
treatments for asthma. We report efficacy/safety findings from a 3-month MF/F study in subjects with severe asthma.

**Materials and methods:** This was a 3-month, randomized, double-blind, parallel-group, multicenter study with a 2-3-week open-label, run-in period of mometasone furoate (MF) 400 μg twice-daily (BID). Subjects (≥12 years) were randomized to MF/F (200/10 μg or 400/10 μg BID) or MF (400 μg BID). The primary endpoint was the area under the curve (AUC) of the change in serial FEV₁ (0-12 hours) for MF/F 400/10 μg vs MF 400 μg from baseline to Week 12. Adverse events (AEs) and other clinical safety measures were recorded.

**Results:** A total of 728 subjects (mean: age = 47.9 y, asthma duration = 14.0 y, FEV₁ % predicted = 66.3, reversibility = 22.9%, Asthma Control Questionnaire [ACQ] score = 1.93) were randomized. Improvements in mean changes from baseline in FEV₁ AUC₀₋₁₂ h (L × h) at Week 12 were MF/F 200/10 μg = 3.59, MF/F 400/10 μg = 4.19, and MF 400 μg = 2.04, with both MF/F doses significantly better than MF (p < 0.001). These FEV₁₅s correspond to average hourly increases of 0.30, 0.35, and 0.17 L, respectively. MF/F was associated with rapid (< 5 min) and sustained improvement in lung function. The percentage of subjects experiencing asthma deterioration (ie, severe asthma exacerbation) was 12.4% (MF/F 200/10 μg), 12.2% (MF/F 400/10 μg), and 18.3% (MF 400 μg). There were no notable differences in AEs between the groups.

**Conclusions:** Both medium- and high-dose MF/F combination therapy led to significantly greater improvements in lung function compared with high-dose MF monotherapy in severe asthmatics.