Asthma and Endocrine Disorders

Symposium 8

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Potential Conflicts of Interest

- Speaker Bureau: AstraZeneca
- Stock: <$20,000 AstraZeneca, ImmunoGen
- Research Paid to University: Forest, Boehringer Ingelheim, Genentech, Merck
- Research Paid to Practice with <$10,000 personal: Genentech
- Legal: Case review < $5,000 not related
- Journal: Allergy Watch, JACI
- Organizations: AMA, ACP, ACCP, AAAAI
Learning Objectives

• To describe associations between diabetes, obesity and asthma, and the special considerations in their management.
• To describe associations between thyrotoxicosis and asthma and implications for treatment
Evidence Basis for Significant Association of Endocrine Dysfunction and Asthma
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What Can We Talk About?

• Retrosternal thyroid goiter may cause wheeze
  – Fixed or dynamic extrathoracic obstruction with changes in flow volume loop
  – Greater wheeze with inhalation than exhalation

• Hyperactive thyroid may aggravate side effects of beta agonists or theophylline

• Hyperactive thyroid may increase osteoporosis associated with ICS/CS Rx
**Association of Thyroid Disease and Asthma**

  - 2 patients with asthma and hyperthyroidism improved after treatment of thyroid dysfunction
  - Subsequently asthma symptoms worsened when thyroid function again became hyperthyroid (increased T3)
  - Conclusion: hyperthyroid state may worsen asthma and patients with both conditions should be closely monitored
Association of Thyroid Disease and Asthma

  - 10 hyperthyroid patients without known asthma underwent BHR testing before and after treatment of thyroid disease
    - No change was noted
    - Authors concluded that thyroid hormone does not directly influence BHR
Association of Thyroid Disease and Asthma

  - Two patients reported with new onset thyrotoxicosis followed by wheezing within several weeks
  - Authors theorized that “reactive oxygen species” may be contributory factor in exacerbating wheezing
Association of Thyroid Disease and Asthma

  – 4 cases of thyrotoxicosis associated with worsening of asthma control
  – All patients had improved asthma with return to euthyroid status
  – Authors stated “mechanism for harmful interaction is not known”
  – Nothing has changed since 1990
Association of Thyroid Disease and Asthma

  - Double-blind, placebo controlled cross-over trial of effect of intentional hyperthyroid state on mild asthma (?where is the IRB?)
    - T3 given to induce a hyperthyroid state
    - Bronchial hyperreactivity assessed with methacholine, exercise challenge and PFTs
    - 4 week duration of each arm
  - No effect on BHR, PFT, or exercise challenge
Association of Thyroid Disease and Asthma

  - 7 patients with hyperthyroidism and asthma were treated and became euthyroid
  - Asthma was monitored before and after becoming euthyroid
  - 2 patients showed no change in asthma symptoms, 2 patients improved and 3 patients worsened (no PFTs)
  - No uniform effect of hyperthyroid state on asthma
Association of Thyroid Disease and Asthma

• Conclusions
  – Hyperthyroid state may cause worsening of asthma symptoms which may improve with treatment of thyroid condition
  – No evidence of physiologic pulmonary changes with change in thyroid function
  – Hyperthyroidism may increase the side effects of beta agonists and theophylline
  – Corticosteroid metabolism may be increased with hyperthyroidism
  – Goiter could cause airway compression
Association of Thyroid Disease and Asthma

• Conclusions
  – Increased thyroid state, either natural or iatrogenic, may contribute to bone loss associated with inhaled or systemic corticosteroid therapy
  – Hypothyroidism associated with nasal congestion and cough but no association with worsening of asthma
  – Publishing on thyroid disease and asthma may help sustain your career (Bateman, Irwin, Lipworth)
Asthma and Adrenal Function

- Hypocortisol state or Addisons Disease increase eosinophilia and has been reported to worsen or possibly cause onset of asthma or wheezing
- Hypopituitary condition has not been associated with asthma to my knowledge
Asthma and Sex Hormones

• Asthma exacerbations have been well described in association with menses
• Menstruating females have a higher incidence and prevalence of asthma compared to males
  – Post menopausal females have the same incidence of asthma as males
• Pregnancy may affect asthma but difficult to predict response
Asthma and Diabetes

• Diabetes and asthma are associated
  – Possibly shared risk of obesity
  – Leptin is linked to obesity and decreases glucose tolerance and has been reported in some studies to be associated with asthma
  – Glucose intolerance is associated with sleep apnea
Asthma and Diabetes

• Chest 2006
  – 293,124 patients with asthma compared to 552,623 patients with hypertension but no diabetes
  – Multivariate analysis showed diabetes to be independently associated with asthma
    • 4.5% of diabetes had asthma compared to 2.9% of hypertensive, nondiabetic controls
    • Asthma diagnosis based upon billing codes
Asthma and Diabetes

- Corticosteroid therapy for asthma will aggravate glucose intolerance or diabetes
  - Recurrent oral candidiasis with ICS may suggest diabetes
  - Increased susceptibility to infection, including both pneumonia and sinusitis, associated with diabetes

- Combination of insulin therapy of hyperglycemia and ICS or systemic CS Rx increase risk of hypokalemia