Thunderstorm Asthma

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ANU – Rural Clinical School
Chair, Guidelines Committee, Australian Asthma Handbook
Please close your eyes!
BUSY!!

What other words come to mind?
Would you and your workplace be able to cope?

Thunderstorm asthma – an unprecedented emergency
Seminar format

- Thunderstorm asthma – background
- Who is at risk?
- Cases

Prevention and management strategies for at risk groups
Brief review diagnosis and management of asthma

- Proactive approach – be prepared!
History in Australia

- 1987: November Melbourne
- 1989: November Melbourne
- 1990: Tamworth NSW
- 1997: October Wagga Wagga NSW
- 1998: Newcastle NSW
- 2010: November Melbourne
- 2014: Canberra ACT
- 2016: 21 November Melbourne – 9 deaths

Several incidents have also been recorded internationally
Emergency ambulance calls

Figure 8: Triple Zero (000) emergency ambulance calls presented to ESTA for 21–22 November 2016

Peak between 7-7.15pm
Respiratory presentations to Victorian Emergency Departments, 2001-2016

Thunderstorm Asthma

Supported by the Department of Health and Human Services (Vic)
When and why...

- Occurs during the rye grass pollen season
  - Between October and December (majority in Nov.)
- Large pollen grains rupture
  - One hypothesis is moisture in the cloud fragments the pollen into smaller particles
- Smaller starch particles are inhaled into the very small airways
  - Larger particles are usually filtered in the nose

G B Marks et al. Thorax 2001;56:468-471
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Proposed pre conditions:

- High concentrations of allergenic material:
  - mainly rye grass pollen also could be fungi and/or dust
- Thunderstorm outflow
- Respirable sized particles (<10 microns)
- Exposure of people who are sensitive to the relevant allergen – can be either allergic rhinitis and/or asthma
Type of thunderstorm

Visual representation of one hypothesis for the mechanism of thunderstorm asthma

1. Whole pollen grains get swept up into cloud as storm matures.
   - Flowery grasses

2. Moisture in the cloud fragments the pollen into smaller pieces.
   - Whole grain fragments

3. Dry, cold outflows carry pollen fragments to ground level, where people breathe them into their lungs.
   - Pollen fragments

- Updraft
- Downdraft
- Outflow
The challenges of epidemic thunderstorm asthma are...

- Largely invisible
- Geographically dispersed and widespread
- Has a rapid onset
- Unfamiliar - with less practiced response protocols
Who is at risk and what do we know?

• Data sources from Melbourne event limited
• ED visits and follow up
• Asthma Australia survey
• ? Characteristics of those who came to primary care- GP and pharmacy
Almost all had hayfever

- 28% had known current asthma (in last 12 months)
- 26% had symptoms suggesting undiagnosed asthma
- 15% had past asthma (> 12 months prior)
- 30% had never had asthma symptoms

*METSARC (Melbourne ETSA research collaboration)
Asthma Australia survey

N = 3,396 responses (Self reported) from people “affected” by the thunderstorm asthma event.

- 79% experienced an asthma “attack”
- Hay fever (allergic rhinitis)
  - 92% suffered from hay fever
  - 60% were treating hay fever
- History of asthma
  - 40% no previous diagnosis of asthma
- Asthma & hay fever
  - Over half had both
- Asthma first aid awareness
  - 53% of people with asthma were aware of first aid steps
  - 25% of people not diagnosed were aware of asthma first aid
- Asthma diagnosis and experiencing an asthma attack
  - 73.5% had been prescribed a preventer
  - Only half were taking it daily in the lead up to the 21st Nov 2016
- Asthma Action Plans
  - 28% yes; 57% no, 15% never heard of one
Who is at risk?

- Allergy to ryegrass pollen
- Allergic rhinitis (with or without known asthma)
- Asthma (especially if poorly controlled)
- Those not taking asthma preventer (inhaled corticosteroid -ICS)
- Exposed to open air before and during thunderstorm in pollen season
  - Risk is greatest during the first 30 mins of thunderstorm, but can continue into next day
  - Living in an area prone to high pollen counts, historically South Eastern Australia
Be prepared!

“if you wheeze or sneeze
be proactive for spring”
4 risk groups

• Current asthma
• Ever asthma
• Allergic rhinitis - no asthma
• No allergic rhinitis, no asthma
Any history of ASTHMA diagnosis or symptoms?

- NEVER asthma

**Assessment for Asthma (as per Australian Asthma Handbook)**

- Past Episode TSA
  - Patients who have ever had asthma symptoms or any treatment within the last 2 years
  - Patient does NOT have SEASONAL ALLERGIC RHINITIS and has NEVER had ASTHMA
  - Patient has SEASONAL ALLERGIC RHINITIS and has NEVER HAD ASTHMA

- Patient has SEASONAL ALLERGIC RHINITIS and has NEVER HAD ASTHMA

Thunderstorm Asthma

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George K

- 47 year old landscape gardener
- Asthma since childhood
- Prescribed an ICS/LABA

- What else do you need to know?
- What are your prevention/management strategies?
Andrew

- 28 year old, moved to your regional area 2 years ago for work
- Hayfever last year
- Asthma as a child/young adolescent but says he “grew out of it”

- What else do you need to know?
- What are your prevention/management strategies?
Gheeta N

• 35 year old accountant
• Hayfever every year since she moved to Australia 15 years ago
• Uses OTC nasal decongestants and antihistamines
• Not history of asthma, no wheeze

• What else do you need to know?
• What are your prevention/management strategies?
Janet S

- 67 year old retired teacher
- NIDDM, hypertension, osteoarthritis, hypothyroidism
- No asthma or hayfever
- Son in law and 2 grandchildren have asthma

- What else do you need to know?
- What are your prevention/management strategies?
Thinking about these patients

- What else do you need to know?
- What are your prevention/management strategies?
How can thunderstorm asthma be prevented?

Review patients with asthma for allergic rhinitis and those with allergic rhinitis for asthma

- Good asthma control
  - Use regular preventer if prescribed (most adults with asthma)
- Good allergic rhinitis control
  - Regular intranasal corticosteroid
- Written Asthma Action Plan
- Education
  - Understanding of risk factors, having reliever and knowing how to use it, avoid breathing outdoor air during a thunderstorm
- Know asthma first aid
Risk group - current asthma

George

• Manage as per current guidelines – most will be on regular low dose inhaled corticosteroids (ICS)

• Ensure correct use of inhalers, check adherence

• Review for allergic rhinitis and treat if present - intranasal corticosteroids 6 weeks prior to and throughout pollen season

• Always carry reliever

• Current Written Asthma Action Plan

• Warn against being outdoors during thunderstorms in grass pollen season
Risk group - current asthma not on ICS (few)

Assess individual current and past history

- Only seasonal asthma - commence low dose ICS 6 weeks prior to pollen/thunderstorm season (suggest 1 September 2017)
- No reported seasonal tendency for asthma but has seasonal allergic rhinitis - commence low dose ICS 6 weeks prior to pollen/thunderstorm season (suggest 1 September 2017)
• **Risk group - any history of asthma**
  
  **Andrew**

• **Review for seasonal allergic rhinitis**
  
  – If present, treat with intranasal corticosteroids 6 weeks prior to and throughout pollen season

• **Evaluate need for inhaled corticosteroids (ICS)**
  
  – Consider allergies, seasonality of symptoms, how long since last asthma episode, severity of previous asthma, other medical, psychological and social factors
  
  – If only ever ETSA – commence low dose ICS 6 weeks prior to pollen/thunderstorm season (suggested 1 September 2017)

• **Explanation of how to recognise asthma symptoms and what to do**
  
  – **Carry a reliever** and know how to use it, ensure correct device use (see NAC videos [www.nationalasthma.org.au/health-professionals/how-to-videos](http://www.nationalasthma.org.au/health-professionals/how-to-videos))
  
  – Provide Asthma First Aid information (and spare for child minders)
  
  – Updated written AAP

• **Warn against being outdoors during thunderstorms in grass pollen season**
Asthma management principles

- Asthma is a chronic disease
  - Needs ongoing care
  - Not just about treating asthma attack
  - Ongoing self-management education
    - Asthma Action Plans

- Need to consider
  - Lifestyle issues
  - Medical management
  - Comorbidities
Asthma control

- Involves both:
  - Assessment of recent asthma symptom pattern and severity, reliever use and effect on activities
  - Assessment of risk factors for future adverse events e.g. past flare ups, life threatening asthma, adverse effects of treatment
Current recommendations

Prescribe a regular inhaled corticosteroid for all adults and adolescents who report any of the following:

- asthma symptoms twice or more during the past month
- waking due to asthma symptoms once or more during the past month
- an asthma flare-up in the previous 12 months.

When starting regular inhaled corticosteroids, begin at a low dose
- review response 6–8 weeks later.
Step up – Step down principles

- Aim of medication management is to maintain good asthma control with the lowest effective dose of ICS
- Step up if asthma not well controlled
- Step back when asthma well controlled
- Need to consider
  - Potential risks e.g. previous serious events/hospitalisations
  - Severity of asthma
  - Treatment-related adverse effects
  - Achieved therapeutic benefits
  - Patient’s wishes
- Once asthma well controlled, review 3-6 months
Step up step down......

Adults

- Referral
- FEW PATIENTS
  - Higher dose regular preventer
  - ICS/LABA combination (moderate-high dose)
- Consider referral
- SOME PATIENTS
  - Stepped up regular preventer
  - ICS/LABA combination (low dose)
- MOST PATIENTS
  - Regular preventer
  - ICS (low dose)

Children

- Referral
- FEW CHILDREN
  - Stepped up regular preventer
  - ICS (high dose) or ICS (low dose) plus montelukast or ICS/LABA combination (low dose)
- Consider referral
- SOME CHILDREN
  - Regular preventer
  - ICS (low dose) or montelukast or cromone
- ALL CHILDREN
  - As-needed reliever
  - SABA®
  - Review recent control and risk regularly

**Thunderstorm Asthma**

Supported by the Department of Health and Human Services (Vic)
Definitions of ICS dose levels in adults

<table>
<thead>
<tr>
<th>Inhaled corticosteroid</th>
<th>Daily dose (mcg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td><strong>Beclomethasone dipropionate †</strong></td>
<td>100–200</td>
</tr>
<tr>
<td><strong>Budesonide</strong></td>
<td>200–400</td>
</tr>
<tr>
<td><strong>Ciclesonide</strong></td>
<td>80–160</td>
</tr>
<tr>
<td><strong>Fluticasone propionate</strong></td>
<td>100–200</td>
</tr>
</tbody>
</table>

† Dose equivalents for Qvar (CFC-free formulation of beclomethasone dipropionate currently available in Australia).

**Note:** The potency of generic formulations may differ from that of original formulations. Check TGA-approved product information for details.

**Source**
Stepped approach to adjusting asthma medications in adults

DPI (Flixotide, Seretide): Accuhaler; DPI (Breo): Ellipta
Stepped approach to adjusting asthma medications in adults

**FEW PATIENTS**
Higher dose regular preventer
ICS/LABA combination (moderate-high dose)

**SOME PATIENTS**
Stepped up regular preventer
ICS/LABA combination (low dose)

**MOST PATIENTS**
Regular preventer
ICS (low dose)

**ALL PATIENTS**
As-needed reliever
SABA

**Referral**

**Some patients**

Symbicort 400/12 DPI 1 puff bd
Symbicort 200/6 pMDI 2-4 puffs bd
Symbicort 200/6 DPI 1 puff bd*
Symbicort 100/3 pMDI 4 puffs bd*

**Most patients**

Symbicort 200/6 DPI 1 puff bd*
Symbicort 100/3 pMDI 2 puffs bd*
Symbicort 100/6 DPI 1 puff bd*
Symbicort 50/3 pMDI 2 puffs bd*

**Few patients**

Symbicort 400/12 DPI 1-2 puffs bd
Symbicort 200/6 pMDI 2-4 puffs bd
Symbicort 200/6 DPI 2 puffs bd*
Symbicort 100/3 pMDI 4 puffs bd*

*Conventional or SMART

Pulmicort 400 DPI 1 puff od
Pulmicort 200 DPI 1 puff bd or od
Pulmicort 100 DPI 1 puff bd or od

DPI: Turbuhaler; pMDI: Rapihaler
Remember

• Before introducing further treatment
  – Check device technique (up to 90% use incorrectly)
  – Check adherence

• Medication
  – Lowest effective dose to minimise side effects

• When on multiple inhaled medications aim for consistent devices
  – Less variety of devices = Less room for error
Risk group - allergic rhinitis but never asthma (Gheeta)

For people with allergic rhinitis but no history of asthma at any stage:

- Identify those allergic to grass pollens- seasonal, “hayfever”
  - Treat with intranasal corticosteroids (INCS) beginning 6 weeks before and throughout pollen season
- Manage allergic rhinitis as per current guidelines

- Explanation of how to recognise asthma symptoms and what to do
  - **Carry a reliever and know how to use it**, ensure correct device use (see NAC videos [www.nationalasthma.org.au/health-professionals/how-to-videos](http://www.nationalasthma.org.au/health-professionals/how-to-videos))
  - Provide Asthma First Aid information

- Warn against being outdoors during thunderstorms in grass pollen season
Allergic rhinitis review – management
Allergic rhinitis treatment

- Intranasal corticosteroids (INCS)
  - Most effective medication for controlling symptoms
  - Also effective for ocular symptoms associated with allergic rhinitis
  - May also help with asthma symptoms

- Antihistamines
  - Mild allergic rhinitis
  - Children who cannot tolerate INCS

- Montelukast (*Singulair®* and generics)
  - Those with concurrent asthma
  - Young children
  - Children who cannot tolerate INCS
Allergic rhinitis treatment cont’d.

• Antihistamine nasal spray may be used in combination with INCS

• Allergen avoidance
  – Important to confirm allergen

• Specific allergen immunotherapy (desensitisation)
  – Sublingual or subcutaneous immunotherapy
  – Can modify allergic immune responses

• Oral corticosteroids should be avoided
ALLERGIC RHINITIS TREATMENTS

CORTICOSTEROID
- Flunisolide 50mcg
- Beconase 50mcg
- Rhinocort Allergy 50mcg

ANTIHISTAMINE
- Azep 125mcg

COMBINATION
- Dymista 125/50 mcg

DECONGESTANT
- Nasal Spray

RESOURCES
- National Asthma Council Australia
  - "How-to" videos for nasal spray technique
  - Clinical recommendations for asthma & allergies
  - Patient advice, leaflets and brochures
  - nationalasthma.org.au

SALINE
- Saline spray
- Saline irrigation

ANTICHOLINERGIC
- Afrin nasal (30mcg)

Thunderstorm Asthma
Supported by the Department of Health and Human Services (Vic)
# SUMMARY - Thunderstorm asthma prevention in adults with grass pollen allergy

<table>
<thead>
<tr>
<th>Condition</th>
<th>Regular INCS</th>
<th>Regular ICS</th>
<th>Written asthma action plan</th>
<th>Thunderstorm avoidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergic rhinitis</td>
<td>✓</td>
<td></td>
<td>*</td>
<td>✓</td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Asthma and allergic rhinitis</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

All SHOULD CARRY A RELIEVER

*Patient with allergic rhinitis should have a written allergic rhinitis plan.

See ASCIA website: www.allergy.org.au
General advice for those at risk

• Avoid breathing outdoor air before and during a springtime thunderstorm, especially during wind gusts just before the storm breaks.
• Stay indoors with windows closed and air conditioner off or on recirculation mode, or shut car windows and recirculate air.
• Note: Wearing a protective mask is not currently recommended as part of standard prevention.
NO asthma and no allergic rhinitis (Janet)

- People without either asthma or allergic rhinitis are at very low risk
- Reassure them their risk is low
- Educate about asthma symptoms
- Encourage to learn Asthma First Aid so they can help others
- Prudent avoidance of wind gusts before thunderstorms
Proactive approach is the key

.........How do we prepare?
Advice for patients if a thunderstorm is forecast in spring

• Always carry a reliever puffer
• If prescribed, take daily preventer as instructed
• Know the signs of worsening asthma and the asthma first aid steps
• If any signs of asthma follow a personal asthma action plan or if no personalised WAP then follow the asthma first aid steps
• If asthma symptoms are rapidly worsening, call 000 and state having an asthma attack
• For those with known sensitivity to pollen and who get allergic rhinitis stay inside on high pollen and windy days, and just before, during and after a thunderstorm
At your clinic

• Be aware of thunderstorm asthma forecast
• Ensure bronchodilators are in date and have adequate supply
• Have a supply of spacers
• Have a clinic policy for patients presenting with an asthma flare up/attack
  – For all staff, including medical receptionists, practice nurses and general practitioners to know their responsibilities
  – Train all staff in asthma first aid and have chart on display
• Utilise recall systems for people with asthma to have regular review of their asthma
At your hospital/ED

- Be aware of thunderstorm asthma forecast
- Ensure bronchodilators are in date and have adequate supply
- Have a supply of spacers
- Review policy and protocols for management of actor asthma
- Review policy and protocols for epidemics/surge of presentations
At your pharmacy

- Ensure adequate supply of bronchodilators
- Maintain adequate supply of spacers
- Have a pharmacy policy for patients presenting with an asthma flare up/attack
  - For all staff, including pharmacy assistants, dispensing technicians and pharmacists to know their responsibilities and prioritise these patients
  - Train all staff in asthma first aid and have chart on display
  - Know which GP clinics are open and able to assist if appropriate
- For patients requesting hay fever medications, ask about asthma symptoms. Suggest GP review if asthma symptoms are identified.
In summary

• Be proactive leading up to spring
  – Don’t wait for something to happen

• Ensure correct diagnosis of asthma and/or allergic rhinitis
  – Ensure patients know and understand management of triggers

• Address both lifestyle and medical management of asthma and allergic rhinitis
  – Take preventer every day if prescribed
  – If seasonal symptoms or prior thunderstorm asthma only, ideally start before 1st September (the first day of Spring), but make sure everyone is started by 1st October (AFL/NRL grand final weekend)

• All people with asthma to have a current Written Asthma Action Plan and know how to use it

• Awareness of Asthma First Aid for all

• Have access to a “reliever” and know how to use it

State Government “Public Health Campaign” early Spring Asthma Australia COACH Program: 1800 ASTHMA
References

- The November 2016 Victorian epidemic thunderstorm asthma event: an assessment of the health impacts. The Chief Health Officer’s Report, 27 April 2017
- State Government Victoria, Review of response to the thunderstorm asthma event of 21-22 November 2016, April 2017
- Also
  - NAC Information paper “thunderstorm asthma”, soon to be released
  - Asthma in Australia 2011
  - Global Initiative for Asthma (GINA) 2017
Objectives

• Describe the phenomena of thunderstorm asthma and environmental circumstances
• Identify who is at greater risk of thunderstorm asthma
• How to manage patients with increased risk of thunderstorm asthma
• Apply current, evidence – based best practice of asthma and allergic rhinitis to professional practice
www.nationalasthma.org.au

Ph: 1800 032 495

National Asthma Council Australia
Australian Asthma Handbook