OPTIMISING ASTHMA CARE IN THE CHILD – A BRAND NEW APPROACH

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Asthma is an increasingly common problem in Singapore and around the world, especially among children. Childhood Asthma can be a significant burden not only in terms of health care costs but also from reduction in participation in activities and school absenteeism as well as parental loss of work days and anxiety. Allergies can and often do play an important role in children with asthma. Medical and scientific advancement has also improved our understanding of asthma and allergies and our ability to manage them effectively. We have now well established treatment goals and management protocols which, together with thorough education and monitoring, can achieve optimal care of any child with asthma and allergies. This paper discusses some of the management steps and the overall concept of the first comprehensive asthma and allergy management programme for children in Singapore.
Contents

- Asthma in Singapore children
- Optimal asthma care in the child
  - Evaluation and diagnosis
  - Education
  - Allergen and trigger avoidance
  - Pharmacological therapy
  - Monitoring and supervision
- The Children’s Asthma and Allergy Network
  - Inpatient and outpatient asthma and allergy services
  - Asthma patient database
  - Resources in print
  - Resources through the Internet
  - “I CAN!” Asthma and Allergy Hotline
  - Other activities of the “ICAN!” programme
    - Asthma and Allergy Public Talks and Exhibitions
    - Asthma and Allergy Workshops for our partners (Nurses and Private Medical Practitioners)
    - “ICAN!” School Focus
    - “! CAN!” Kid’s Outdoor activities
    - Parent Support Groups
- The Children’s Asthma and Allergy Network Team members
As with the management of any chronic disease in childhood, asthma has to be approached with the child as an individual, with the family as the setting and the community as the background. The internationally established goals of asthma management in the child have to be strictly observed in order to achieve optimal care of the patient and the family.

Asthma management in the child goes beyond just pharmacological therapy; A comprehensive diagnostic process coupled with education of the patient and family is necessary to ensure optimal implementation of therapy. This has to be accompanied by close monitoring and re-evaluation as well as allergen and trigger management. The thrust of the continued care and disease control should be focused on the patient and family so as to empower them to take control of the condition with the aid of the asthma action plan, various educational print materials as well as through open communication with the physician or nurse.

An ideal comprehensive asthma management programme specially designed for the child should be a one-stop facility, encompassing both in-patient and outpatient services, utilizing useful and attractive educational materials and management aids as well as providing enhanced communication between the patient and the specialists and also covering education of the public/ schools and working in close partnership with primary and private healthcare providers as a team working towards the best care for each and every child. The first and only programme of this nature in Singapore is the "I CAN !" programme at the Children's Medical Institute, National University Hospital.

**Asthma in Singapore Children**

Singapore has certainly not been spared from the increasing prevalence of asthma and allergies around the world. Childhood asthma prevalence studies have been reported in Singapore since 1967 and while the methodologies of various studies through the years have been different, the general trend is indicative of an increasing prevalence. More recent data from 1994 and 2001 using the ISAAC (International Study of Asthma and Allergy in Childhood) protocol has also indicated a consistently high prevalence of asthma among children in Singapore. About one in every five school children has asthma locally and this level is comparable with many affluent countries around the world. While the reasons for this increase in prevalence are poorly understood, environmental factors likely influence the susceptibility to the development of asthma in predisposed individuals.

The level of asthma care in Singapore is probably very high, even when compared to any major city in the world. The findings of a recent study reviewing the state patient knowledge, attitudes and behaviour related to asthma across the Asia Pacific region, AIRIAP, however suggested that our patients may not be achieving the internationally accepted goals of asthma therapy. Amongst other findings, it showed that there was a significant proportion of asthmatic patients that were symptomatic, a high proportion of patients requiring acute asthma care (indicative of poor overall asthma control), a high
prevalence of work or school absenteeism from asthma-related reasons, and an overall inadequate use of inhaled corticosteroids. The study also showed that the use of asthma action plans and lung function assessment was relatively low. It is therefore important for us to review our asthma management protocols and programmes to make good the deficiencies in order to achieve the optimal care for our patients.

Optimal Asthma Care for the Child

The goals of asthma management in the child as established by international asthma review bodies such as the GINA guidelines can be summarized in the following points:
1. Control symptoms
2. Prevent recurrent exacerbations
3. Unrestricted lifestyle, maintain normal activity level
4. Optimal pharmacological therapy with minimal or no adverse effects
5. Maintain (near) 'normal' pulmonary function
6. Meet patients' and families' expectations of satisfaction with asthma care

These goals can only be achieved through the following essential steps:
1. Thorough evaluation and accurate diagnosis
2. Education of patient and family
3. Allergen and trigger avoidance
4. Appropriate pharmacological treatment and delivery of medication
5. Adequate monitoring and supervision

• Evaluation and Diagnosis
  Appropriate treatment is only possible after the correct diagnosis is made. In a young child, the wide variety of causes of wheezing can sometimes pose some difficulty in differentiating viral-associated wheeze from asthma. Studies in the west have demonstrated that features significantly associated with Asthma at 6 years of age are:
  - Recurrent wheezing
  - Family history of asthma
  - Presence of other atopic manifestations
  
  Asthma can often be diagnosed on the basis of a detailed history alone but measurement of lung function and parameters of airway inflammation as well as reversibility of lung function abnormalities can greatly enhance the diagnostic confidence.
  
  Spirometry and its measurement of FEV1 and FVC is a simple and useful tool for diagnosis, assessment of severity as well as monitoring treatment response and long term progress. This procedure however requires cooperation and can only be performed on children above 5 years of age. Impulse oscillometry can now be used to evaluate for airway obstruction and reversibility in young children as young as 2 years of age.
The peak expiratory flow rate is a cheap and simple device. It is important to note that PEF measurements do not always correlate with other measurements of lung function in asthma and do not always correlate with asthma symptoms or other measures of disease severity. It may however be useful in monitoring patients whose asthma is labile or in those who have poor perception of their symptom severity.

Exhaled nitric oxide (eNO) is a noninvasive marker of airway inflammation in asthma. It is however not a specific marker of asthma but may be useful for monitoring disease progression with treatment and may pre-date deterioration in asthma symptoms.

Evaluation of the allergic component in asthma is useful in identifying risk factors and triggers so that appropriate environmental control measures can be recommended. Skin tests with allergens are the most important diagnostic tool because of their simplicity, rapidity of performance and relative low cost and high specificity. The presence of a positive skin test does not necessarily mean that the disease is allergic in nature and the relevant exposure and its relation to symptoms must still be carefully evaluated and confirmed by a detailed patient history.

- **Education**
  Chronic diseases such as asthma often have intermittent symptoms but require long-term treatment. It is important that the patient and family have a good understanding of the condition and its treatment, in particular, the need for and importance of continued therapy even during asymptomatic periods. The different roles of various medications as well as the techniques in inhaler administration and allergen avoidance and use of the asthma action plan are also important areas of emphasis. The areas of focus can be summarized as:
  1. Understanding of the disease
  2. Understanding of role of different drugs and the need for continued prophylaxis
  3. Understanding of techniques of inhaler use
  4. Understanding the role of allergens and triggers and how to avoid them
  5. Understanding of the Asthma Action Plan and how to use it
  6. Recognition of asthma symptoms

- **Allergen and Trigger Avoidance**
  Reduction in exposure to a variety of triggers including allergens and pollutants can improve the control of asthma and reduce the need for medication use. The allergens our local patients are most commonly sensitized to are the house dust mite allergens. Effective control strategies should be tailored to individual allergens, flexible to suit individual needs, and cost effective. Other common allergens are animal dander, cockroach allergen and fungi. Outdoor pollutants such as particulate matter (the haze), nitrogen oxides and ozone are best avoided by
staying indoors when the levels are significantly high. Food allergy as an exacerbating factor for asthma is uncommon and occurs primarily in young children. Food avoidance should best be avoided unless proper double-blind food challenge has been performed. Exercise and physical activities should not be restricted in any child unless during acute exacerbations; Exercise-related symptoms are more often a feature of poorly-controlled asthma and usually improve with proper asthma therapy rather than avoidance of exercise. It is important not to restrict the child's activity and diet unnecessarily.

- **Pharmacological Therapy**
  Medications for asthma are used to reverse and prevent symptoms and these are classified as relievers or preventers respectively. The choice of therapeutic agents and the selection of delivery devices should be customized to each and every child based on the patient’s condition and his or her proficiency in using the inhaler device. While inhaled medication is still the choice for asthma, there are newer oral formulations that may be used in some patients, particularly the very young, who are adverse to the inhaled route. Corticosteroids are still the cornerstone of anti-inflammatory therapy in asthma today. Further reinforcement on patient education is essential to allay parents’ anxiety about the use of corticosteroids and even inhalers themselves in the treatment of childhood asthma. It is important to reaffirm the safety profile of inhaled corticosteroids in children when used appropriately and in appropriate doses. Starting doses as well as adjustment of doses should be tailored according to the condition and its progress, complimented by close monitoring and evaluation.

- **Monitoring and Supervision**
  This is essential to ensure that the medication and advice given to the patient is accepted and followed appropriately and an important step in ensuring the optimal outcome for the patient. Some of the points that need to be reviewed at each clinic contact include:
  1. Symptom review – day/night/during exercise
  2. Activity limitation – school/work/exercise and why
  3. Compliance – reasons for non-compliance
  4. Delivery technique checks
  5. Delivery device checks
  6. Action plan review/revision
  7. Evaluation and treatment of concomitant upper airway allergies (allergic rhinitis, sinusitis)
  8. Address any fears, concerns, questions or doubts in the patient or family and to review their expectations of the treatment programme.
The Children's Asthma and Allergy Network

The Paediatric Asthma and Allergy Services at The Children's Medical Institute, National University Hospital has developed a brand new comprehensive programme to optimize the care and understanding of asthma and allergy in children. The name of our programme spells the word “CAN” which signifies the ability of every child with asthma and/or allergies to participate in all activities and lead a normal lifestyle while using the least medication necessary. It reaffirms a positive outlook to the condition(s) and reminds us that all children with asthma or allergies CAN do all things like any other child of his/her age.

The “I CAN!” programme is the first and only comprehensive integrated programme for children with asthma and allergies, focusing on achieving the internationally established management goals to achieve a normal healthy and unrestricted lifestyle for all children with asthma and allergies. This programme is designed to achieve this through a comprehensive coordinated one-stop programme which encompasses both in-patient and out-patient services (including acute facilities at the children's emergency service) and includes useful and attractive educational materials and management aids as well as providing better communication between patients and healthcare providers through telephone hotlines and internet connections and also through better education of the public and close cooperation and communication with our partners who are the private healthcare providers.

- **Inpatient and outpatient Asthma and Allergy Services**
  All patients hospitalized with asthma and allergy-related conditions will be seen by our team of asthma and allergy specialists at the Children's Medical Institute. All patients will be thoroughly evaluated and their management optimized. Our team of asthma nurse specialists will also review the patient and reinforce asthma education and counseling including inhaler technique revision and allergen and trigger avoidance measures.
  Outpatients will be seen at our Children's Asthma Clinics or Allergy Clinics and when the condition is stabilized, they will be encouraged to have their routine follow-up by our “I CAN!” partners.
Acute visits can be seen at our Children's Emergency at the Children's Medical Institute or at our “I CAN!” partners following protocols developed by our programme.

- **Asthma Patient Database**
  A comprehensive database has been developed to monitor the progress of all patients within the programme. This includes patients' medication profile and symptom profile as well as pulmonary function data and details of all clinic visits and telephone contacts. The progress and treatment details can also be closely charted over time.

Follow-up defaulters or poor-compliance patients will also be highlighted within the database and brought to the attention of the team for closer followup and perhaps reminder calls.

- **Resources in Print**
  A comprehensive range of educational booklets, pamphlets and leaflets on asthma and allergies will be made available to our patients and families as well as our primary healthcare partners. These print materials are designed specially for simple reading and should stimulate interest and increase understanding on the care and management of children with asthma and allergies. Some of the print materials that will be available in this programme include:

  - **Asthma Information Booklet**
    A comprehensive attractive booklet with cartoon illustrations on all general aspects of childhood asthma; From diagnosis to changes in the airway in asthma to the treatment and prognosis of asthma in the child.

  - **Asthma Diary**
    A simple yet functional attractive booklet for patients to keep track of their own asthma control objectively with peak flow charting and symptom score charting, a fun and functional way to encourage children to take control of their asthma.

  - **Asthma Action Plan**
    A revised attractive new asthma action plan is designed to aid the patient/parents/care-givers in the adjustment of asthma medications in times of acute asthma changes.

  - **Asthma and Allergy Patient Education Pamphlets**
    These are simple to read and informative practical information pamphlets on various aspects of asthma and allergy for patients and parents. These include topics such as 'Food and Asthma', 'Exercise and Asthma', 'Eczema and food' etc.
• Bi-Annual Newsletters
  This will be mailed to participants and partners in our programme to update them on new developments in asthma and allergy and provide useful practical information on related topics. Activity updates as well as announcements related to the programme will be made here.

• Asthma and Allergy Awareness & Management Posters
  Catchy and attractive yet informative and educational posters will be made available and distributed to our primary healthcare partners and organizations and institutions who are interested.

• Resources through the Internet
  The “I CAN!” website will also be launched for the convenience of our IT savvy patients and partners. The website will allow patients (and our partners, the primary healthcare providers) to:
  1. Access most of the print collateral online
  2. Link to reputable and useful asthma and allergy sites
  3. Access the Question & Answer forums with Paediatric Asthma & Allergy specialists in NUH (questions sent in will be answered on a case to case basis and updated on a monthly basis)
  4. Access latest updates on activities organized by “I CAN!”

Patients can also email or fax in their questions to our website administrator and coordinator.

• “I CAN!” Asthma and Allergy Hotline
  A telephone hotline for patients to call in to for general advice will be set up. This will be manned by our asthma nurse-specialist during office hours. The nurse specialist will then direct the patient to the doctor in charge or the necessary medical facility if necessary. Basic advice will be given over the automated telephone system after office hours.

A separate hotline for our partners (Private physicians) will also be available for the doctors to consult our specialists and also discuss patients and arrange transfers or referrals to the hospital. This will be a direct link between the general practitioners and our specialists, serving to enhance our communication and cross-referrals.

• Other activities of the “I CAN!” programme:
  Asthma and Allergy Public Talks and Exhibitions
  In the drive to improve the public's perception and understanding of asthma and allergic diseases in children, the “I CAN!” programme will reach out to the public through talks and exhibitions in the form of a ‘Roadshow’ concept at selected places across the island. This educational and awareness programme will also be made available to interested parties upon request (eg. schools, ministries ... etc.)
subject to approval by NUH. We will incorporate a brief educational talk on asthma and allergies tailored to the needs of the audience.

**Asthma and Allergy Workshops for our partners** (Nurses and Private Medical Practitioners)
Regular workshops will be held to update doctors and nurses on asthma and allergies in children through practical as well as didactic sessions. This will also serve as an opportunity to interact with our “I CAN!” partners and improve the relations and links with other members of our healthcare fraternity.

“I CAN!” School Focus
Next to the home, children spend the most time in schools in Singapore. We have identified that schools are important areas to reach out to in order to improve the overall care and understanding of asthma and allergies in children. A series of educational talks on Managing Asthma in Schools will be available to improve the understanding and acute management of asthma in schools specially catered to the school teachers and parents. This will enhance the school's ability to appropriately respond to asthma symptoms in school and also improve the teachers' understanding of students with asthma. These talks will be made available to schools on request and the approach will be practical, easy to understand and fun.

“I CAN!” Kid's Outdoor activities
As part of our drive to encourage a healthy active lifestyle for children with asthma and allergies outdoor activities will be planned to take these children (and their families) to outdoors. Possible locations for our first camp (planned for May 2003, during the week of the World Asthma Day) include Fort Canning Park, Botanical Gardens or Sentosa Island.

A ‘small walk’, modeled against the popular annual ‘big walk’ is also planned.

**Parent Group Links**
An **Allergy Support Group for Kids** (ASK) has recently been set up to enable parents with asthmatic children to meet and interact and support each other, facilitated by our specialists and focusing on children with severe allergies eg. Food Allergies.

**Reminders and Souvenirs**
To help children and parents and the general public have a better awareness of the “I CAN!” programme, we are preparing a whole range of visual “soft” reminders. These may include “I CAN!” cashcards (for all participants in the programme) as well as stickers, T-shirts, caps and writing materials with the “I CAN!” logo. These will also serve to promote a sense of belonging to the programme and its vision and goals, which is to enable every child to say “I CAN! To a healthy and normal lifestyle despite Asthma and Allergies”.

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The Children’s Asthma & Allergy Network Partners:  
All Participating Private Medical Practitioners