UNUSUAL CAUSE OF ADRENAL INSUFFICIENCY

Dr. Khushboo

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BRIEF HISTORY

7 year old male child presented with

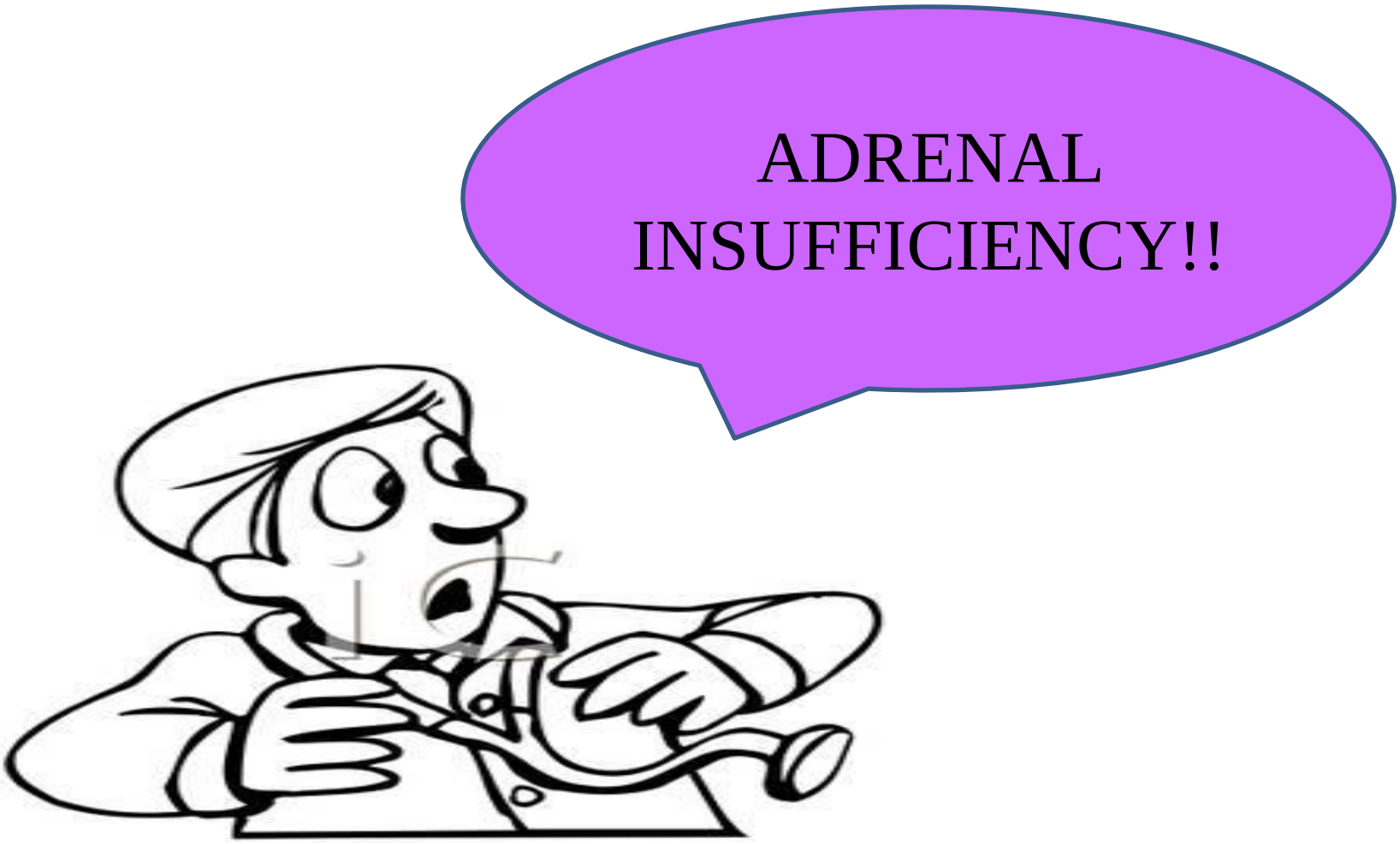
- Fever : 3 days
- Vomiting : 3 days
- h/0 Acute encephalopathy with fever
- O/E : B/L wheeze present

HISTORY (CONTD)

- Past History : **being treated as moderate persistent asthma** with allergic rhinitis on inhaled steroids for 1 year
- Family history : insignificant

INVESTIGATION

- RBS : 61
- Sodium : 116
- Potassium :4.2
- Magnesium : 1.4


ADRENAL
INSUFFICIENCY!!

FURTHER MANAGEMENT

- Blood sample for cortisol levels taken
- Inj Hydrocortisone started
- Appropriate intravenous fluids
- Nebulisation with bronchodilator as required

WHAT IS CORTISOL LEVEL ?

0.7 ng/ml

What's normal but ?

NORMAL LEVELS of CORTISOL
70-250ng/ml

WHAT'S THE CAUSE ?

Reason for acute adrenal insuffiiency

↓

Known wheezer

↓

on Inhaled fluticasone for past one year

(500µg/day)

(along with intermittent use of intranasal steroids)

THEN WHAT HAPPENED NEXT

- Child was continued on hydrocortisone

↓

Electrolytes improved along with the clinical condition of the child

↓

Repeat serum cortisol levels : 220ng/ml

WHAT NEXT ?

ACTH stimulation test

- This test evaluates the ability of the adrenal cortex to produce cortisol after stimulation by synthetic ACTH .
- It does not test the whole pituitary-adrenal axis. The short test assesses the ability of the adrenal gland to respond to ACTH

CORTISOL LEVELS

- 0 mins : 0.7µg/dl
- 30 mins : 22µg/dl
- 60 mins : 19.6µg/dl

What does this mean ?

HOW DO I INTERPRET?

- Adrenal insufficiency is excluded by an incremental rise in cortisol of > 200nmol/L and a peak value > 600 nmol/L at either 20 or 30 min.

- This confirms adrenal insuffuciency of pituitary cause
- Child was given short stress dose of hydrocortisone and slowly inhaled steroid was tapered and stopped

OTHER TESTS

- Thyroid profile : normal
- Ultrasound abdoman : normal

A RELOOK AT THE PATIENT

- Anthropometry revealed :

HEIGHT : < 3RD percentile

WHAT HAPPENED TO ASTHMA?

- Child was re evaluated for asthma

1. History
2. Examination
3. Spirometry attempted not completed due to poor effort
4. Bronchoscopy

TRACHEOMALACIA

Discussion

Inhaled fluticasone is an effective maintenance therapy for asthmatic children but in recent years there have been several disturbing case reports of morbidity due to adrenal suppression among children treated with >400 µg/day, the maximum dose licensed by the FDA in the US for children with asthma

Arch Dis Child. 2006;91:808–*813; doi:10.1136/adc.2005.087247*

Literature review

- Survey of adrenal crises on people on inhaled steroids was done in UK.
- 33 patients met the diagnostic criteria
- Of the 33 patients treated with 500–2000 µg/day ICS, 30 (91%) had received fluticasone, one (3%) fluticasone and budesonide, and two (6%) beclomethasone

- ***Arch Dis Child*** **2002;87:457-461 doi:10.1136/adc.87.6.457**

Flat adrenal responses in association with FP occurred in 2.8% of children tested, all receiving ≥1000 μg/day, while impaired responses were seen in 39.6%. Children on above licence FP doses should have adrenal function monitoring as well as a written plan for emergency steroid replacement

Division of Developmental Medicine, University of Glasgow, Royal Hospital for Sick Children, Glasgow, UK 23 March 2006

Hypothalamic-pituitary-adrenal axis suppression in asthmatic children on inhaled and nasal corticosteroids--more common than expected?

- A **THIRD** of asthmatic children on ICS and NS develop HPAS. Contributing factors are the use of NS, body size and cumulative dose of ICS.

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Adrenal cortex insufficiency in children due to inhaled corticosteroids

- flattening growth curve
- tired, nauseous and had abdominal pain
- could not be roused; for the preceding few days he had been nauseous and pyrexic.

Further laboratory tests showed that all three patients had **ADRENAL INSUFFICIENCY**

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Assessment of adrenal suppression in children with asthma treated with inhaled corticosteroids:

use of **DEHYDROEPIANDROSTERONE SULFATE** as a screening test

Annals of Allergy, Asthma & Immunology
Volume 97, Issue 2 , Pages 182-186, 1 August 2006

STEROID DEPENDENT ASTHMA

A NEW ENTITY

- Unlicensed treatments include methotrexate, azathioprine, ciclosporin, and subcutaneous terbutaline infusions.
- Paediatric data are needed on cytokine-specifi c monoclonal antibody therapies and bronchial thermoplasty.

Lancet 2010; 376: 814–25

- Flunisolide aerosol was shown to be safe, acceptable and effective in permitting reduction of oral steroid dosage without increase in symptoms Ann Allergy **1983 Jul;51(1 Pt 1):21-5.**
- A recombinant humanized monoclonal antibody directed against IgE rhuMAb-E25 has potential as a treatment for subjects with moderate or severe allergic asthma.

  N Engl J Med 1999; 341:1966-1973

However, despite the interest in innovative approaches, getting the basics right in children with apparently severe asthma will remain the foundation

TAKE HOME MESSAGE

- Inhaled steroid can cause adrenal suppression
- FLUTICASONE is been found to culprit in most of the cases
- Fluticasone should be cautiously used above 400micrograms per day
- Suspect adrenal insufficiency in patient presenting with dehydration and shock on high dose of inhaled steroids

- **REVISE** your diagnosis when child is not responding to usual management guidelines of ASTHMA
- Growth monitoring should be **IDEALLY** done in children on inhaled steroids

THANK YOU