Endocrine Emergencies: Recognition and Management

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An Update on Acute Medical Emergencies for Psychiatrists

Royal College of Psychiatrists' address is 21 Prescot Street London, E1 8BB - Monday 11th September 2017
HYPONATRAEMIA

1-6% hospital admissions Na < 130 mmol/L

15-22% Na < 135 mmol/L
Hyponatraemia

Dilutional: excess intake of water, increased water re-absorption, e.g., cirrhosis, CCF, nephrotic, reduced renal excretion, e.g., SIADH, steroid deficiency.

Salt deficiency: renal loss, non renal loss, e.g., GI tract.

Pseudohyponatraemia: lipids, protein.
Features of hyponatremia

Dependant on rate of development and cause

Develops if Na < 115 mmol/L or more rapidly if fall is rapid

Na < 100 mmol/L is life threatening

Features neurological – confused

headache

seizures
Investigations

Urinary sodium (greater or less than 20 mmol/L)
Volume status – needs assessing
Others – osmolality
cortisol
thyroid function
liver biochemistry
electrophoresis
SIADH
More common in the elderly

Diagnosis
\[ \text{\textdownarrow Na} \quad \text{\textdownarrow plasma osmolality (<270)} \]
Inappropriate urine osmolality (>100)
Excessive renal loss > 30mmol/L
Normal adrenal, thyroid function

Investigate
chest
head

Challenges in the treatment of Cushing's disease

Diagnosis  -  Do they have it? Where is it?
Mortality/morbidity

-  infection
-  psychiatric
-  clotting tendency
-  diabetes
-  hypertension
-  obesity
-  osteoporosis
Cushing’s disease

6 months ago, before Cushing’s Disease

July 2009, with Cushing’s Disease again

Cushing Syndrome
- Red cheeks
- Fat pads (Buffalo Hump)
- Thin skin
- Bruisability or Ecchymoses
- High blood pressure
- Red striation
- Thin arms and legs
- Pendulous abdomen
- Poor wound healing
Causes of Cushing’s syndrome

• Pseudo-Cushing’s syndrome:
  Alcoholism <1%
  Severe depression 1%

• ACTH dependent:
  Pituitary adenoma 68% (Cushing’s disease)
  Ectopic ACTH syndrome 12% (where is it?)
  Ectopic CRH syndrome <1%

• ACTH-independent:
  Adrenal adenoma 10%
  Adrenal carcinoma 8%
  Nodular (macro-or micro-) hyperplasia 1%
  Carney complex (skin pigmentation, myxomas, endocrine tumours, e.g., nodular adrenal disease)
## Diagnosis of Cushing's

<table>
<thead>
<tr>
<th>Test</th>
<th>False +ves</th>
<th>False -ves</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>24h urinary free cortisol</td>
<td>1%</td>
<td>5-10%</td>
<td>95%</td>
</tr>
<tr>
<td>Overnight 1mg dexamethasone suppression test</td>
<td>2% normal</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13% obese</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>23% hospital inpatients</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Midnight cortisol</td>
<td>?</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Low-dose dexamethasone suppression test</td>
<td>&lt;2%</td>
<td>2%</td>
<td>98%</td>
</tr>
</tbody>
</table>
## Differential Diagnosis of Cushing’s

<table>
<thead>
<tr>
<th>Test</th>
<th>Pituitary-dependent disease (% with this finding)</th>
<th>Ectopic disease (% with this finding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum potassium &lt;3.2mmol/L</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Suppression of basal cortisol to &gt;50% on high-dose dexamethasone suppression test</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>Exaggerated rise in cortisol on CRH test</td>
<td>95</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>
Phaeochromocytoma
- who screened?

Family history
MEN II
von Hippel Lindau
neurofibromatosis

Paroxysmal symptoms
Hypertension
Hypertension during anaesthetic induction
Unexplained heart failure
Adrenal incidentaloma

10% normotensive
Phaeochromocytoma

α blockade then β blockade
α blockade – phenoxybenzamine or doxazosin

B blockade - propranolol 20-80mg 8 hourly

Aim BP 130/80 or less

Jafri and Maher 2012 ESE 166: 151
Contraindicated drugs in Phaeochromocytoma

β blockers
D2 receptor antagonists
Tricyclic antidepressants
MAOI’s
Opioids
Background
Addison’s Disease

Any form of stress in patients with adrenal insufficiency is a significant risk of adrenal crisis or even death.

Recommendation:-
100mg at induction
200mg per 24 hours by continuous infusion until end of peri-operative period then resume replacement in normal doses.
Case History

C.C. Aged 23
Weight loss 65 to 45kg
Holiday in Borneo – pigmented
Vomiting Na 126 x 2
Not investigated
Case History

C.C. Aged 23
Weight loss 65 to 45kg
Holiday in Borneo – pigmented
Vomiting Na 126 x 2
Not investigated
Died – undiagnosed Addison's
Addison’s disease

Primary
Prevalence 93 – 140/million
Incidence 4.7 – 6.2/million in Caucasians

Secondary
Hypothalamo-pituitary disease
Exogenous steroids
> 5mg prednisolone > 1 month:-
  - oral
  - inhaler
  - joint
  - steroid creams for eczema

Congenital adrenal hyperplasia
Post treatment of Cushing’s

Charmandari et al Lancet 2014 383 2152-2167
Features of Addison’s

Anorexia & weight loss 100%
Tiredness, weakness 100%
Skin pigmentation 94%
Postural hypotension 88-94%
Abdominal pain
Arthralgia
Headache
PUO 13%
Salt craving 16%
Secondary vs. Primary

No mineralocorticoid deficiency

No pigmentation
Investigation

Na ↓ (90%)  (normocytic)
K ↑ (65%)
Cortisol ↓
ACTH ↑
Synacthen

Anaemia
Eosinophilia
Mild-hypercalcaemia

Adrenal suppression - Depot synacthen
Diagnosis of adrenal insufficiency

Synacthen test 250mcg i.m/i.v.
Measure cortisol at 30 – peak > 600 nmol/L
Any time of day
Prevalence of adrenal insufficiency

9 per 100,000
Adrenal crisis occurs 6-8 times per 100 years
These can be fatal

Patients on steroids 7 in 1,000
Features of impending Addisonian crisis

Volume resistant hypotension
Early - malaise
    somnolence
    cognitive dysfunction
    postural hypotension
    hponatraemia
    pyrexia

If in doubt give hydrocortisone
In the short term - side effects are minimal
How to avoid precipitating an acute adrenal crisis

Most importantly, heed patients’ requests for hydrocortisone

John A H Wass *professor of endocrinology*¹, Wiebke Arlt *professor of medicine*²
Emergency Management - Life threatening!

Fluids – several litres first 24 hours

Hydrocortisone 100mg i.v.
+ 100mg i.m then 6 hourly

or

200mg i.v. by continuous infusion/24 hours

Not mineralocorticoid because xs glucocorticoid steroids

Patients will die if inadequately treated
Patients on Steroids

Prednisolone    more than 5mg/day
more than 1 month

NB. Inhaled steroids
dermatological steroids
joint injected steroids

All suppress the synacthen test
Steroid equivalent doses

Hydrocortisone 10mg
Prednisolone 2.5 mg
Dexamethasone 0.4mg
Physiology

20mg of hydrocortisone released from adrenals daily

Bound to cortisol binding proteins 95% - free 5%
Pathophysiology

Primary (Addison’s disease) - deficient in cortisol & aldosterone

Secondary - deficient only in cortisol

Congenital adrenal Hyperplasia: - enzyme deficiency
causing - children and adults
deficiency of cortisol**

- need steroid cover
Hydrocortisone

Minor - endoscopy 100mg i.m. before

Moderate - hernia repair - 100mg i.m. 6 hourly/24 hours

Major - open heart surgery - 100mg i.m 6 hourly/72 hours
Then resume normal medication

Major illness
Hydrocortisone 100mg i.m. 6 hourly until illness resolved
Hypothyroidism

Epidemiology

7.5% of females
2.5% of men
1.7% overt hypothyroidism
13.7% subclinical hypothyroidism

> 65 years

Oxford Handbook of Endocrinology
2014 Ed. Wass & Owen
Causes of Hypothyroidism

Hashimoto’s thyroiditis
Post operative 131 Iodine
Drugs e.g., amiodarone
Pituitary/Hypothalamic disease
Post partum
De Quervain’s
Subclinical Hypothyroidism

**Diagnosis**

↑ TSH  Normal T4  Repeat TSH twice

Treat if  + a/b
past radioiodine
TSH > 10 MU/L
or less if symptoms
Treatment of Hypothyroidism

1.6 – 1.8 mcg/kg/day

Give am on fasting stomach

Start 50-100 mcg/day except elderly
    elderly 25-50 mcg

Increments 25 mcg at 4 weekly intervals

TSH above normal and <2.5 mU/L

Check annually

T4 in hypopituitary patients
Myxodema Madness