

## Medical emergencies in primary care: Addisonian (adrenal) crisis

NEW

This course offers a practical guide for GPs, providing them with the knowledge and skills required for the recognition and emergency treatment of Addisonian (adrenal) crisis. While many patients will receive treatment via critical care services during an emergency adrenal crisis, it is key that GPs and primary care...



30 minutes



0.5 CPD points



(22)



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Good for:

GPs

GP trainees

Practice nurses

Physician associates



**Acute adrenal insufficiency**, also known as **adrenal crisis** or **Addisonian crisis**, is a life threatening emergency resulting from a lack of cortisol, the major glucocorticoid. [1] It can affect patients with adrenal insufficiency of any aetiology.

## Significance

Patients with established adrenal insufficiency and those receiving chronic exogenous supraphysiological glucocorticoid treatment (eg for asthma or autoimmune disease) and topical or injected steroids, including for joint or back problems, are at possible risk of adrenal crisis. Adrenal insufficiency-related hospital admissions and adrenal crises (with their associated morbidity and mortality) have increased considerably in the last two decades, [2] [3] with one in 200 adrenal crises being fatal. [1] [4]

## Adrenal insufficiency and primary care

The GP plays an important role in the early detection of Addison's disease and adrenal insufficiency. Diagnosis of adrenal crisis may be delayed due to presentation with nonspecific symptoms, resulting in misdiagnosis of other conditions such as gastritis.

Adrenal crisis can be rapidly fatal. Without prompt recognition and treatment, there is a high risk of death from circulatory collapse "shock" or respiratory arrest, or risk of irreversible complications such as cardiac arrhythmias, cardiac arrest, hypoglycaemia, and hypoglycaemic coma.

Each year, more than 8% of patients with Addison's disease require hospital treatment for an adrenal emergency, [4] [5] [6] with vomiting and diarrhoea being the most frequent causes. [7]

## What is adrenal insufficiency?

Adrenal insufficiency relates to the reduced production of steroid hormones by the adrenal glands, which are essential for the ongoing functioning of the body.

Adrenal insufficiency affects some or all of the adrenal gland cortex function, with, critically, a reduction in the production of glucocorticoids such as cortisol, [10] which regulate the stress response, metabolism, and the immune response. [11]

It can be primary, secondary, or tertiary depending on the cause of the disruption to the production of steroid hormones.



## Primary adrenal insufficiency (Addison's disease)

**The adrenal cortex itself is damaged, reducing production of cortisol and mineralocorticoids such as aldosterone and adrenal androgens, eg dehydroepiandrosterone (DHEA).**

Addison's disease is rare endocrine condition, affecting about one in 14 000 people, with an upper estimate of around 9000 diagnosed cases in the UK. Around 320 new cases are diagnosed each year in the UK. [\[12\]](#) [\[13\]](#)

While the most common age of onset is 30 to 50 years, almost half of all diagnoses occur outside of this range, and can be at any age from 5 years to 80 years.

Causes include:

- Autoimmune condition (most common cause in the UK)
- Infection, eg tuberculosis (most common cause worldwide)
- Genetic factors
- Injury (bilateral).

## Secondary adrenal insufficiency

**The production of adrenocorticotrophic hormone (ACTH) in the pituitary gland is reduced, causing reduced production of cortisol.**

Secondary adrenal insufficiency occurs if the regulation of adrenal cortisol production by the pituitary or hypothalamus is compromised as a consequence of a hypothalamic-pituitary condition, such as:

- Pituitary tumours or hypophysectomy
- Subarachnoid haemorrhage
- Traumatic brain injury
- Pituitary infarction (eg Sheehan syndrome)
- Tumours of the hypothalamus
- Hypothalamic surgery.

## Tertiary adrenal insufficiency

**The hypothalamus and pituitary production of corticotropin-releasing hormone (CRH) and ACTH are suppressed by exogenous medication/drug use.**

Causes of tertiary adrenal insufficiency include:

- Long term oral corticosteroid use
- Long term inhaled corticosteroid use
- Long term topical corticosteroid use
- Depot long acting corticosteroid use
- Long term, high-dose opioid use.

Long term steroid use is a common cause of adrenal insufficiency due to atrophy of the adrenal cortex. Oral corticosteroids are used by approximately 1% of the adult population in the UK for conditions such as asthma, polymyalgia rheumatica, and inflammatory arthritis. This percentage increases when other forms of administration are considered, such as inhaled, intranasal, intra-articular, and intramuscular steroids. [\[14\]](#)

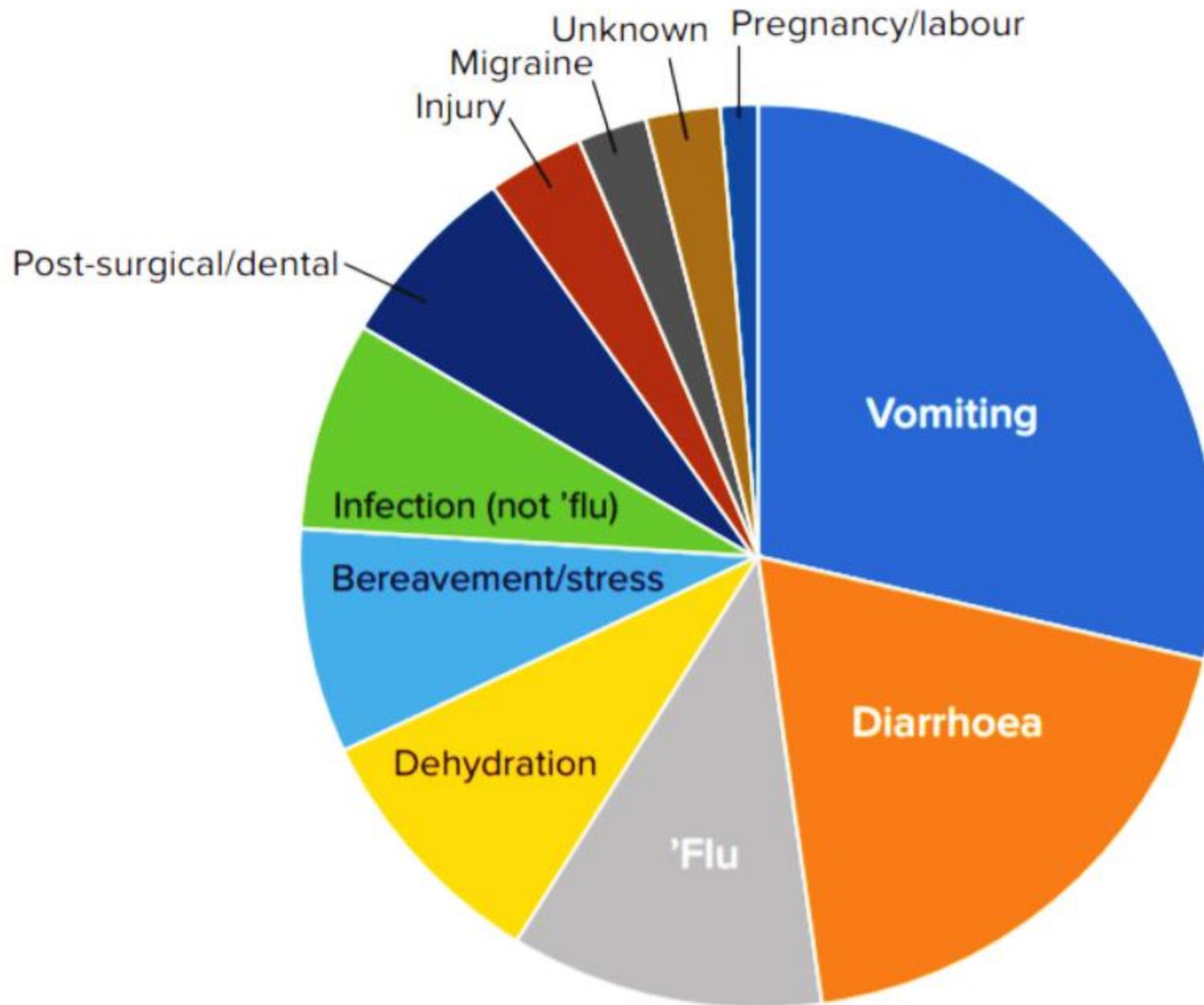
Patients on long term steroids (especially oral steroids taken at high doses for some time), patients using high doses of inhaled steroids, and patients receiving frequent intra-articular steroids are at particularly high risk of developing adrenal insufficiency. [\[15\]](#)

## Who is at risk?

**Adrenal crisis is a medical emergency and can be rapidly fatal.** [\[9\]](#) [\[16\]](#) [\[17\]](#)

If a body with fully functioning adrenal glands undergoes a stress event, such as injury, illness, or severe psychological stress, extra cortisol will be produced to cope with the increasing physiological demands of the illness or injury. In someone with adrenal insufficiency, this response is absent and can rapidly lead to shock and death, known as adrenal crisis. This is why the **'sick day rules'** (below) are critical.

Adrenal crisis can occur in someone known to have adrenal insufficiency, or as a first presentation of undiagnosed adrenal insufficiency. It is also a risk in those on long term steroids (eg prednisolone 5 mg daily or equivalent for four weeks or more [\[18\]](#)) who become unwell, or abruptly stop their steroids. This is due to the exogenous corticosteroids suppressing the hypothalamic-pituitary-adrenal axis.



## Recognition of adrenal crisis

### Signs and symptoms of adrenal crisis can include:

- Nausea/vomiting
- Abdominal pain
- Low grade fever
- Muscle pain
- Headache
- Hypoglycaemia (especially in children)

### Later signs/symptoms include:

- Reduced consciousness
- Confusion
- Hypotension
- Hypovolemic shock
- Cold peripheries



## Emergency management of an adrenal crisis

If adrenal crisis is suspected, then treatment must be started immediately. It must not be delayed by investigations.

### Hydrocortisone injection

- Hydrocortisone sodium phosphate 100 mg 1 ml vial of liquid, **or**
- Hydrocortisone sodium succinate 100 mg (Solu-Cortef powder) plus 2 ml vial of water
- Intramuscular (blue) needles and 2 ml syringes
- Three to five vials of injectable hydrocortisone in case of breakages and for a second emergency injection kit (for administration in case of vomiting, illness, accident, or other severe injury)

**Note: Hydrocortisone acetate is slow acting so should not be used.**

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