



## **ADRENAL INSUFFICIENCY**

### **1. Medical Condition**

#### **Introduction**

Adrenal insufficiency is a complex condition affecting the different cortical areas of the adrenal glands with corresponding aberrations in endocrine functions. There are a number of different causes that may result in significant morbidity and mortality if undiagnosed/untreated. It is an often elusive condition that requires awareness, knowledge of symptoms and signs and endocrinological expertise to be correctly diagnosed and adequately treated. Adrenal insufficiency occurs with a frequency of 110-120 cases per million persons. The exact incidence among athletes is not known, but for some causes a more frequent occurrence is documented (see below).

#### Primary (complete) adrenal insufficiency:

This is due to a dysfunction of the adrenal glands from congenital or acquired causes. In primary adrenal insufficiency, there is an anatomical loss or severe structural damage to the three adrenal cortical zones.

Congenital disease may result from adrenal hypoplasia or hyperplasia. Congenital adrenal hyperplasia (CAH) results from a deficiency of one of several enzymes required for synthesis of cortisol. The most prevalent CAH disorder is steroid 21-hydroxylase (OH)-deficiency (1: 10,000-18,000 births) which exists in a classic form (manifested in early childhood) subdivided into salt-losing and simple virilising, and a non-classic form (manifested only in late childhood to early adulthood).

The most common type of acquired primary adrenal insufficiency is idiopathic adrenal insufficiency mostly due to autoimmune destruction of the adrenal cortex. Less frequently, mycobacterial, bacterial, viral, and fungal infections may cause adrenal insufficiency by destroying active glandular tissue. In developing countries, tuberculosis is the major cause of adrenal insufficiency.

#### Secondary adrenal (partial) insufficiency:

This is also known as "central" adrenal insufficiency. In partial or secondary (central) adrenal insufficiency, the cortical zone ("zona fasciculata") of the adrenals is intact but functionally inhibited by reductions in ACTH secretion from the pituitary.

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Secondary adrenal insufficiency is most commonly iatrogenic, caused by suppression of the hypothalamic-pituitary-adrenal axis due to exogenous glucocorticoid use. This cause is particularly relevant in an athletic population due to the frequent use of glucocorticoids and their unpredictable uptake into the circulation. Local treatment of musculoskeletal disease with glucocorticoids may inhibit the axis and daily oral use may lead to suppression of the axis within as little as two weeks. Another important consideration in athletes is the fact that adrenal insufficiency may occur months or even years after traumatic brain injury due to pituitary insult. Other reasons for central adrenal insufficiency include hypopituitarism from other forms of hypothalamic-pituitary disease.

Furthermore, a number of medications may cause damage to the adrenal glands.

The diagnostic and therapeutic work-up in adrenal insufficiency of whatever cause differs, depending on the presentation, either as an acute crisis or from slowly evolving chronic disease. It is critical to establish whether the adrenal insufficiency is primary or secondary.

For the purpose of these Guidelines, diseases and differential diagnoses that render a patient too impaired to be able to exercise and compete (e.g. polyendocrine disorders) are not presented, but the focus is on conditions likely to be encountered in athletes at different activity levels.

## **2. Diagnosis**

### **A. Medical history**

History taking must confirm the signs and symptoms and time of onset, i.e. acute onset/crisis or chronic disease.

#### Congenital disease

Females with classic 21-OH deficiency may present with ambiguous, virilised genitals at birth. Males might go undiagnosed until they present with a salt-wasting crisis within one to three weeks of age, reflecting the degree of mineralocorticoid deficiency. Males without salt loss may present with precocious puberty (pubic hair, accelerated growth at 2-4 years of age), however many remain asymptomatic (other than being of short stature) and may not present themselves to a physician at all, or be incidentally diagnosed in adult life (e.g., during fertility investigations). Females with a non-classic form of CAH show signs of hyperandrogenism from late puberty onwards whereas males may be asymptomatic.

#### Acute crisis

Acute adrenal insufficiency is usually an acute presentation of complete primary adrenal failure. In an acute crisis, history is of particular importance and together with findings on examination represents the main pillar of a

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presumptive diagnosis necessitating immediate treatment after securing blood samples. Any delay in diagnosis by more extensive laboratory investigations may result in poor outcome. The patient is severely ill, may become dehydrated, hypotensive, hypoglycemic and of altered mental status.

An exacerbation of chronic secondary insufficiency due to glucocorticoid is usually less dramatic and urgent, and there is a history of prior glucocorticoid use.

Chronic insufficiency

Chronic insufficiency may manifest as chronic fatigue, weakness, tiredness, hyperpigmentation, anorexia, weight loss, nausea, abdominal pain, diarrhea or constipation with orthostatic hypotension, dizziness or even syncopal episodes. After withdrawal of glucocorticoid therapy, patients typically feel cold, have difficulties in concentrating, bone and muscle pain or headache. In chronic adrenal insufficiency in athletes, poor performance might be observed but compensated by rigid training schedules. Episodes of salt-craving are typical for primary adrenal insufficiency.

The clinical distinction between primary (complete) and secondary (partial) insufficiency is important because secretion of the adrenal androgen precursor dehydroepiandrosterone (DHEA) is affected in a similar manner to that of mineralocorticoid secretion. With structural damage (loss or severe damage) to all three adrenocortical zones, their production is abolished. By contrast, in partial or secondary adrenal failure (as in ageing as well), DHEA secretion and blood DHEA concentrations may be reduced but not abolished. However, reductions in serum DHEA are often difficult to interpret as prolonged exogenous glucocorticoid treatment will suppresses residual adrenal DHEA secretion. There is some evidence, although controversial and not conclusive, that women with primary adrenal insufficiency and pituitary insufficiency may suffer from quality of life symptoms such as sexual dysfunction which may be alleviated by DHEA treatment.

This medical information includes the diagnosis and treatment of this condition in women with primary adrenal failure or pituitary insufficiency on glucocorticoid therapy where the granting of a therapeutic use exemption for DHEA may be considered. For androgen insufficiency, refer to the Physician Guidelines for "Androgen Deficiency/Male Hypogonadism".

**B. Diagnostic criteria (see annex)**

The diagnosis of adrenal insufficiency demands the synthesis of medical history with physical examination, substantiated by appropriate laboratory measurements and tests.

Fatigue and abnormal weakness, especially when challenged by a physical effort, and anorexia are the predominant symptoms reported in adrenal insufficiency.

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The physical findings in chronic adrenal insufficiency are often subtle. Hyperpigmentation associated with ACTH hypersecretion is present in primary adrenal insufficiency often in areas unexposed to the sun such as palmar creases and axillae. There may also be pigmentary lines in the gums. However these signs are not seen in secondary (central) adrenal insufficiency due to chronic suppression of CRH and ACTH by exogenous glucocorticoids.

In acute insufficiency, dehydration, hypotension, hypoglycemia, and altered mental status are present. With mineralocorticoid deficit, the patient might be hypovolemic, hypotensive and tachycardic. Orthostatic hypotension is frequently seen.

**Laboratory measurements<sup>1</sup>**

- Complete blood count: Relative lymphocytosis and neutropenia, eosinophilia
- Blood urea nitrogen, creatinine
- Electrolytes: hyponatremia with or without hyperkalemia is commonly found in primary adrenal insufficiency, occasionally in secondary
- Fasting blood glucose: hypoglycemia particularly in children or in athletes during/after exercise
- Serum cortisol  
Diagnosis is confirmed if serum cortisol level measured between 8.00 am and 9.30 am after an overnight fast (basal cortisol) is less than 3 µg/dL (83nmol/L). Values below 18 µg /dL (500nmol/L) in the presence of a markedly elevated ACTH and plasma renin concentrations are very suggestive of primary adrenal insufficiency and may require further investigation by provocative testing (cosyntropin, CRH, insulin). Values above 18 µg /dL rule out adrenal insufficiency.

Plasma adrenocorticotrophic hormone concentration (ACTH): When serum cortisol is low, ACTH can be decreased or inappropriately normal (secondary or central adrenal insufficiency) or increased (primary adrenal insufficiency).

- Plasma renin and aldosterone concentration considered in conjunction with concurrent evaluation of blood pressure (including postural), ECF volume (hydration status) and electrolytes. High plasma renin with low aldosterone and ECF volume depletion is characteristic of untreated primary adrenal insufficiency.

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<sup>1</sup> This information mentions limit values for parameters though these are not all scientifically proven and will be difficult to apply in a clinical setting where the effect of the hormones and exercise may need to be considered. Threshold values provide some guidance in the case of athletes.

- 17-hydroxyprogesterone level: marked elevation (>242.4 nmol/L; normal value <8.9 nmol/L) is a diagnostic indicator of classic 21-OH- or 11 $\beta$ -OH-deficiency. Elevated early morning values can be used for screening of the non-classic form, but are not diagnostic.

### **Testing<sup>2</sup>**

It is not within the scope of this document to provide the full details of each test. These tests should be undertaken by an endocrinologist in an established laboratory. All test results need to be interpreted in the context in which they were obtained.

### **Cosyntropin testing**

Adrenal insufficiency is likely if serum cortisol level is less than 18  $\mu$ g/dL (500 nmol/L) at 30-60 minutes after administration of 250  $\mu$ g cosyntropin (synthetic ACTH; dose to be modified in children). If the cortisol response to cosyntropin is subnormal but ACTH concentration is not elevated, central (secondary) adrenal insufficiency is likely.

### **Corticotropin-releasing hormone (CRH) stimulation test**

This test is superior to cosyntropin testing in individuals with short-term (less than 3 months) secondary adrenal insufficiency, e.g. after glucocorticoid treatment). Diagnostic cut-off values are the same as for the cosyntropin test.

### **Insulin-tolerance testing or metyrapone stimulation**

These tests are the reference tests for establishing the integrity of the hypothalamic-pituitary-adrenal axis, for example when secondary insufficiency should definitely be ruled out.

### **Antibody tests**

If adrenal insufficiency is confirmed, anti-adrenal antibodies may confirm an autoimmune disorder. They might help with the etiological diagnosis when cortisol levels are low and ACTH elevated. Negative results do not exclude autoimmune adrenalitis, but are useful where other causes such as tuberculosis, adrenal hemorrhage or adrenoleukodystrophy need to be excluded.

### **Imaging studies**

A CT or MRI of the abdomen helps to identify hemorrhage, calcification or infiltration of the adrenal glands. In secondary adrenal insufficiency, a skull CT or MRI may show destruction or mass lesion of the pituitary.

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### **C. Relevant medical information**

The patient's symptoms during the course of treatment over time should be documented and reported by the treating physician, noting any exacerbation (acute crisis) or required adaptation to doses of glucocorticoids and mineralocorticoids. Genetic analyses in congenital disease may confirm the diagnosis.

### **3. Medical best practice treatment**

The mainstay of treatment for primary adrenal insufficiency is substitution with glucocorticoids. Patients with additional mineralocorticoid deficiency might require fludrocortisone acetate.

Emergency situations with sufficient clinical suspicion of an acute crisis require treatment prior to definitive laboratory confirmation or consultation of an endocrinologist but after securing blood samples. This needs to be considered in any case of a retroactive TUE application for emergency treatment.

In case of an acute crisis, the underlying problem precipitating the crisis also requires treatment.

Athletes with adrenal insufficiency due to withdrawal from previous glucocorticoid therapy may require tapering doses of glucocorticoids over weeks or months to stabilise the athlete until symptom-free. The duration of treatment will depend on the duration of initial therapy and in rare cases may last years.

### **A. Name of prohibited substances**

#### **Glucocorticoids**

- Hydrocortisone: drug of choice in emergency treatment and in children (less influence on growth); effective in controlling androgen production (in higher than physiological doses); easy to titrate, mineralocorticoid activity.
- Prednisone: in adults, agent is inactive and needs to be metabolized to active prednisolone; conversion might be impaired in liver disease.
- Prednisolone, methylprednisolone: in adults.
- Dexamethasone: alternative to hydrocortisone to avoid interference with testing.

Note: Fludrocortisone as a mineralocorticoid is not prohibited and used as part of adrenal replacement therapy for primary, not secondary, adrenal insufficiency where salt-losing and volume depletion requires it. It is not generally needed unless a glucocorticoid with low mineralocorticoid activity is used (e.g. dexamethasone).

**DHEA**

While the scientific data remain inconclusive and contentious, DHEA may have a role in females with primary androgen insufficiency only.

**Androgens**

Testosterone has no role in treatment of female athletes with Adrenal insufficiency.

**Gestagens** with strong androgenic activity (e.g. medroxyprogesterone) should be avoided.

**B. Route of administration**

Glucocorticoids:

- Intravenous in emergency situation;
- Oral for permanent glucocorticoid treatment once patient is stable and in chronic treatment;
- Intramuscular, e.g. in emergency treatment prior to admission in acute crisis or prior to surgical intervention.

DHEA:

- Oral

**C. Frequency**

Daily oral glucocorticoid medication with timing in the morning and second dose in late afternoon is important though physiological secretion cannot be imitated.

After emergency treatment, intravenous doses of glucocorticoids need to be tapered and may be discontinued once symptoms resolve, depending on the cause of the crisis. Maintenance glucocorticoid and mineralocorticoid (only in primary adrenal insufficiency) replacement therapy is with oral medication. The athlete should be treated with the lowest possible glucocorticoid dose to avoid symptoms of adrenal insufficiency in order to also avoid adverse effects of excessive glucocorticoids.

Immediately prior to a surgical intervention, patients require stress doses (triple the normal dosage) of glucocorticoids and additional doses should be continued throughout the procedure.

Where DHEA deficiency is established unequivocally in females with primary adrenal insufficiency, DHEA up to a maximum of 25mg may be administered daily. Dose titration based on mass spectrometry-based assays (not immunoassays) for serum testosterone and DHEA may be required.

#### **D. Recommended duration of treatment**

In primary adrenal insufficiency treatment is lifetime with regular clinical and laboratory evaluation. Careful balancing of glucocorticoid therapy is vital and requires continuous surveillance.

Patients need to be advised to increase cortisol dosage in times of physical stress (e.g. operations, infections, but also major endurance competitions). Normal exercise does not require stress doses of glucocorticoids.

Secondary adrenal insufficiency due to oral (or local) glucocorticoids may last for weeks to months and even years, depending on the dose and duration of initial exposure. These patients require replacement therapy (hydrocortisone) with regular monitoring of basal cortisol levels, ideally together with ACTH and relative lymphocyte count (see annex). The relative lymphocyte count reflects long-term glucocorticoid action.

The measurement of serum dehydroepiandrosterone sulphate (DHEAS) (not in CAH) is more sensitive than cortisol and is suppressed by physiological glucocorticoid replacement therapy, and is therefore not diagnostic of adequate adrenal function. Serum DHEAS measurements are therefore left to the discretion of the consultant endocrinologist.

For monitoring the recovery from secondary adrenal insufficiency, if serum cortisol alone is used, once the morning serum cortisol concentration is  $\geq 10$   $\mu\text{g/dL}$  (270 nmol/l) 24 hours after the last dose of hydrocortisone, regular daily hydrocortisone therapy is no longer required but may still be necessary in severe physical stress situations (e.g. surgery).

Measurements of serum ACTH, DHEAS (not in CAH) and cosyntropin/CRH stimulation tests may be performed to assess the need for further treatment under stress. A cosyntropin test alone is not sufficiently sensitive in short-term secondary adrenal insufficiency. If normal results are obtained for all parameters (for cosyntropin test 60 min plasma cortisol  $\geq 18$   $\mu\text{g/dL}$  (500 nmol/l)), and hypothalamic-pituitary-adrenal function is normal, then glucocorticoid supplementation *is no longer required during stress*. If it has not recovered, glucocorticoids still need to be supplemented *during stress* and all tests should be repeated at intervals until they yield normal results.

When early morning serum cortisol is  $< 10$   $\mu\text{g/dL}$  (270 nmol/l), hydrocortisone therapy is continued and the serum cortisol is re-assessed after four weeks. Stress supplementation needs to be continued. After normalisation of cortisol morning values, the procedure above is followed.

#### **4. Other non-prohibited alternative treatments**

In the case of confirmed primary adrenal insufficiency, there is no non-prohibited treatment alternative.

For complete treatment in emergency situations, intravenous fluids, saline/dextrose and other combinations might be required.

#### **5. Consequences to health if treatment is withheld**

Adrenal insufficiency, particularly an acute crisis, is life-threatening and may lead to death if treatment is delayed or insufficiently aggressive. Death may occur due to hypotension, cardiac arrhythmia or central impairment. This should be considered in applications for retroactive TUEs after emergency treatment without definite confirmation of diagnosis.

Other consequences of chronic adrenal insufficiency are chronic ill health with underperformance in physical activity and competitive sport.

#### **6. Treatment monitoring**

It is absolutely essential that a specialist endocrinologist is involved in the management of any athlete with proven adrenal insufficiency of any cause. Due to the delicate balance between administering the lowest possible dose to achieve sufficient substitution on one hand, or overdosing on the other, specialist monitoring should be undertaken at least annually in case of stable disease. Where there is instability of control or in acute cases, monitoring must be more frequent with at least monthly assessment. This may apply to athletes with secondary adrenal insufficiency due to glucocorticoid use.

Furthermore, in female athletes with proven primary adrenal insufficiency who are granted supplementation with DHEA, a baseline steroid profile should be performed prior to therapy using validated mass-spectrometry-based methods<sup>3</sup>, and documented in ADAMS. Profiling should be repeated at regular intervals to be defined by the granting ADO to ensure levels of serum testosterone and DHEA remain within the individual athlete's normal range during supplementation. Reference should be made to the laboratory criteria used to monitor the serum testosterone and DHEA levels of athletes who have been granted supplementation for proven DHEA deficiency.

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<sup>3</sup> The direct (unextracted) testosterone immunoassays currently used by most laboratories are too inaccurate for monitoring serum testosterone during physiological DHEA replacement therapy.

## **7. TUE validity and recommended review process**

The recommended validity of a TUE for an athlete suffering from primary adrenal insufficiency or in case of pituitary disease or surgery is 10 years. Under the supervision of a specialist endocrinologist, there should be annual reviews of clinical status, blood count, creatinine, electrolytes, fasting blood glucose, serum aldosterone, ACTH, cortisol concentration, plasma renin concentration, and further parameters depending on the cause of primary adrenal insufficiency.

In cases of anticipated increased physical stress, such as infections, trauma or surgery, any dosage variation of glucocorticoids, as advised by the treating endocrinologist, should be covered by the original TUE without the need for a new application. The athlete should be advised to report such intermittent increase in dose on the doping control form at the time of testing in case of doping control in the following months.

In treatment of adrenal insufficiency due to glucocorticoid withdrawal, TUEs may be granted for 4-12 weeks, depending on a review of the values of serial basal or stimulated cortisol concentrations. A new TUE will only be issued after clinical and biological verification of a further need due to persisting adrenal insufficiency.

Reference is made to article 4.1 of the International Standard for TUE that a TUE should not be granted if the necessity for the use of a Prohibited Substance is the consequence of prior non-therapeutic use of any Prohibited Substance.

Requirements for the monitoring of DHEA supplementation are described under Section 6.

## **8. Appropriate cautionary matters**

- Adrenal insufficiency is potentially life-threatening. Therefore any delay in treating an acute exacerbation is unjustifiable. In cases where there is clinical suspicion of adrenal insufficiency from any cause, the initiation of treatment with glucocorticoids should always take precedence over further investigations.

With adequate replacement therapy, no restriction in physical activity is required in an otherwise healthy person.

- In the small group of female athletes who present with established primary adrenal insufficiency and where the supplemental use of DHEA is considered, the opinion of an independent, expert endocrinologist must guide and ultimately inform the TUE application. Without such specialist input the application will be considered incomplete by any TUEC.

## **9. References**

- Alkatib AA, Cosma M, Elamin MB, Erickson D, Swiglo BA, Erwin PJ, Montori VM (2009)  
A systematic review and meta-analysis of randomized placebo-controlled trials of DHEA treatment effects on quality of life in women with adrenal insufficiency. *The Journal of Clinical Endocrinology & Metabolism*. 94: 3676-3681.
- Arlt W et al (1999)  
Dehydroepiandrosterone replacement in women with adrenal insufficiency. *New England Medical Journal*. Sep 30; 341 (14): 1013-20.
- Arlt W, Allolio B (2003)  
Adrenal insufficiency. *Lancet*. 361 (9372): 1881-93.
- Crowley RK, Argese N, Tomlinson JW, Stewart PM (2014)  
Central hypoadrenalism. *The Journal of Clinical Endocrinology & Metabolism*. Nov; 99 (11): 4027-36.
- Guinot M, Duclos M, Idres N, Souberbielle JC, Megret A, Bouc Y (2007)  
Value of basal serum cortisol to detect corticosteroid-induced adrenal insufficiency in elite cyclists. *European Journal of Applied Physiology* 99: 205-216.
- Gurnell EM, Hunt PJ, Curran SE, Conway CL, Pullenayegum EM, Huppert A, Compston JE, Herbert J, Chatterjee VK (2008)  
Long-term DHEA Replacement in Primary Adrenal Insufficiency: A randomised, controlled trial. *The Journal of Clinical Endocrinology & Metabolism*. 93 (2): 400-409.
- Hahner S, Allolio B (2005)  
Management of adrenal insufficiency in different clinical settings. *Expert opinions in Pharmacotherapy*. 6 (14): 2407-17.
- Johannsson G, Falorni A, Skrtic S, Lennernäs H, Quinkler M, Monson JP, Stewart PM (2015)  
Adrenal insufficiency: review of clinical outcomes with current glucocorticoid replacement therapy. *Clinical Endocrinology (Oxf)*. 82 (1): 2-11.
- McRobb L, Handelsman DJ, Kazlauskas R, Wilkinson S, McLeod MD, Heather AK (2008)

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Structure-activity relationships of synthetic progestins in a yeast-based in vitro androgen bioassay. *The Journal of Steroid Biochemistry and Molecular Biology*. 110: 39-47.

Merke DP, Bornstein SR (2005)

Congenital adrenal hyperplasia. *Lancet*. Jun 18-24; 365 (9477): 2125-2136.

Montalvan B, Duclos M (2008)

Why glucocorticoids ought to be kept on WADA's list of banned products. *British Journal of Sports Medicine*. Online publication 6 Oct.

Quinkler M, Oelkers W, Remde H, Allolio (2015)

Mineralocorticoid substitution and monitoring in primary adrenal insufficiency. *Best Practice Research Clinical Endocrinology Metabolism*: 29 (1): 17-24.

Salvatori R (2005)

Adrenal insufficiency. *Journal of the American Medical Association*. Nov 16; 294 (19): 2481-2488.

Skouby OS Al-Azzawi F, Barlow D, Calaf-Alsina Erdogan Ertüngealp J, Gompel A, Graziottin A, Hudita D, Pines A, Rozenberg S, Samsioe G, Stevenson JC; European Menopause and Andropause Society (2005)

Climacteric medicine: European Menopause and Andropause Society (EMAS) 2004/2005 position statements on peri- and postmenopausal hormone replacement therapy. *Maturitas* 51: 8-14.

Ten S, New M, Maclaren N (2001)

Clinical Review 130 – Addison's Disease 2001. *The Journal of Clinical Endocrinology & Metabolism*. 86 (7): 2909-2922.

Weise M Drinkard B, Mehlinger SL, Holzer SM, Eisenhofer G, Charmandari E, Chrousos GP, Merke DP (2004)

Stress Dose of Hydrocortisone is not beneficial in patients with classic congenital adrenal hyperplasia undergoing short-term, high-intensity exercise. *The Journal of Clinical Endocrinology & Metabolism*. 89 (8): 3679-3684.

Wierman ME, Arlt W, Basson R, Davis SR, Miller KK, Murad MH, Rosner W, Santoro N (2014)

Androgen therapy in women: a reappraisal: an endocrine society clinical practice guideline. *The Journal of Clinical Endocrinology & Metabolism*. 99: 3489-3510.

Willenberg HS, Bornstein SR, Chrousos GP (2007)

Adrenal Insufficiency. In: Fink G (Ed.): *Encyclopedia of Stress*. Academic Press, Oxford 2007, Vol. 1. 47-51.

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**Annex: Diagnostic algorithm in the work-up of a patient/athlete with adrenal insufficiency**

