A GUIDE TO

HYPOPITUITARISM

Australian Pituitary Foundation

INCIDENCE

Approximately 1,070 people are diagnosed with hypopituitarism every year in Australia. This represents around 4.2 new cases per 100,000 population per year[1].

PREVALENCE

Approximately 11,600 Australians currently live with hypopituitarism. This represents around 45.5 cases for every 100,000 population[1].

ABOUT HYPOPITUITARISM

The pituitary gland is a pea-sized structure hanging by neural connections from the bottom of the brain. In healthy people, the pituitary gland controls the function of most other endocrine glands in the body. It does this by producing a number of hormones (or chemical messages) that regulate these other glands.

Hypopituitarism is a condition where the pituitary gland does not produce enough of one or more pituitary hormones. In turn, this affects hormone production by the other glands in the body that rely on pituitary hormones. Hypopituitarism is most often caused by[2]:

- Tumours in or near the pituitary gland causing pressure on normal pituitary tissue.
- Surgery to remove a pituitary tumour, particularly if the tumour is large.
- Radiotherapy treatment for a brain tumour, where the pituitary gland is damaged by the radiation.

Other less common causes of hypopituitarism include:

- Head or brain injury
- Severe bleeding in the brain or severe blood loss during childbirth (Sheehan's Syndrome)
- Rare diseases or infections (e.g. meningitis, tuberculosis)
- Certain conditions present at birth
- Unknown causes.

Sometimes hypopituitarism is caused by the pressure of a pituitary tumour that is producing excess hormone. In these cases, some pituitary hormones are low (hypopituitarism) while others are high at the same time.

PRESENTING SIGNS AND SYMPTOMS

The signs and symptoms of hypopituitarism usually develop gradually and can get worse over time. For some people, signs and symptoms can be subtle and overlooked for months or even years. For others, signs and symptoms develop suddenly.

Signs and symptoms of hypopituitarism vary from person to person, depending on which pituitary hormones are affected and to what degree. In people who have more than one pituitary hormone deficiency, the second deficiency may increase or, in some cases, hide the symptoms of the first deficiency.

The symptoms of hypopituitarism depend on which hormone or hormones are missing. These are listed in Table 1.

Table 1: Common symptoms associated with missing pituitary hormones

MISSING PITUITARY HORMONE	TARGET ORGAN	OTHER HORMONES AFFECTED	SYMPTOMS
Growth Hormone (GH)	Whole Body	-	Lack of growth and sexual development (in children), excessive tiredness, muscle weakness, decreased bone density, increased body fat, reduced quality of life
Adreno-corticotrophic hormone (ACTH)	Adrenal glands (located above kidneys)	Cortisol	Pale appearance, low blood pressure, dizziness, tiredness, weight loss, stomach pain, depression, low tolerance of emotional/physical stress, reduced quality of life
Follicle Stimulating Hormone (FSH) / Luteinising Hormone (LH)	Ovaries (women)	Estrogen and Progesterone	Irregular or loss of periods, low libido (sex drive), hot flushes, loss of body hair, vaginal dryness (pain during sex), sleep disturbance
	Testes (men)	Testosterone	Erectile dysfunction, low libido (sex drive), low sperm count, infertility, loss of facial and body hair
Thyroid Stimulating Hormone (TSH)	Thyroid gland (located at base of neck)	Thyroid hormones	Weight gain, decrease energy, sensitivity to cold, constipation, dry skin, hair loss, concentration difficulties
Prolactin	Breast	-	Inability to produce breast milk
Antidiuretic hormone (ADH)	Kidney	-	Extreme thirst, frequent urination and large volume of urine (polyuria) (symptoms of diabetes insipidus)

INVESTIGATIONS

A number of tests may be used to diagnose hypopituitarism. These include:

- **Blood test -** to measure levels of pituitary hormones and the hormones of their target glands. Often pituitary hormones can be in a low-normal range, but hormones produced by their target glands will be low.
- **Stimulation tests -** to assess the response of target organs to certain hormones.
- **Urine tests -** often carried out over 24 hours to assess the levels of hormones produced.
- **Magnetic resonance imaging (MRI) or computed tomography (CT) scan -** to see the pituitary gland.
- **Vision testing -** to assess the visual field, as sometimes a tumour can press on the optic nerve connecting the eye to the brain causing vision disturbances.

Further investigations will be based on symptoms, under the guidance of an endocrinologist. This will depend on the outcomes of the initial tests and the type(s) of hormone(s) not being produced. These may include:

- **Adrenal function:** Stimulation tests are used to assess adrenal function. Examples of stimulation tests that are most commonly used include the insulin tolerance test (the ITT), the glucagon stimulation test (GST) and the short Synacthen test (SST). Early morning cortisol can also be measured by blood tests.
- **Growth hormone:** A stimulation test is used to assess growth hormone deficiency. These tests measure growth hormone in response to insulin or glucagon.
- **Sex hormones:** A blood test will be used to measure FSH, LH, prolactin, estradiol, progesterone and testosterone levels. For women, a menstrual history will be taken. For men, a semen analysis (sperm count) may be conducted if fertility is desired.
- **Thyroid function:** A blood test will be used to measure TSH and circulating thyroid hormone levels (including free thyroxin).
- **Diabetes insipidus:** Tests can include measurement of urine volume, urine and blood sodium levels and a water deprivation test.

TREATMENT

Medication is generally the first step to treat hypopituitarism. This is usually called 'hormone replacement therapy', because the dosages are set to match the amounts that the body would produce if it didn't have a pituitary problem. The precise medications will depend on the hormones that are missing (Table 2). In some cases, treatment of the condition that is causing hypopituitarism may lead to a complete or partial recovery of the body's ability to produce pituitary hormones.

Table 2: Medications for missing pituitary hormones

MISSING PITUITARY HORMONE	MEDICATION
Growth Hormone (GH)	Growth hormone replacement therapy, given by injection into the fat under the skin. Under Australian government rules (the Pharmaceutical Benefits scheme: PBS), tests are required to prove that treatment is needed and beneficial. A written application to the Department of Human Services from your endocrinologist is required to receive this treatment.
Adrenocorticotrophic hormone (ACTH)	Cortisol replacement therapy**, sometimes referred to as 'steroid therapy'. Treatment with corticosteroids (hydrocortisone, cortisol acetate or prednisolone). See notes below for important dosing information.
Follicle Stimulating Hormone (FSH) / Luteinising Hormone (LH)	Women: Estrogen (patches or gel applied to skin or tablets) and progesterone replacement. If fertility is desired, gonadotropin (fertility treatment) may be needed to induce ovulation.
	Men: Testosterone replacement, given by injection into the muscle, patches or gel applied to the skin or tablets. If fertility is desired, gonadotropin (fertility treatment) may be needed to induce sperm production.
Thyroid Stimulating Hormone (TSH)	Treatment with Levothyroxine (tablets) to replace thyroid hormone levels.
Antidiuretic hormone (ADH)	Treatment of diabetes insipidus: desmopressin (acts like ADH) by nasal spray, tablets or melt-wafer.

ONGOING MANAGEMENT

Regular check-ups will be needed to monitor hormone levels and manage other consequences of hormone deficiencies and/or medication. This includes assessing general physical health and well-being, mental health, heart and bone health. If a tumour is the cause of hypopituitarism, follow up appointments may also include scans to check for tumour growth.

****Important notes on cortisol replacement therapy:**

Your endocrinologist will work with you to determine your optimum dose of replacement corticosteroid. Higher doses are taken in the morning as this matches the body's natural cycle. This dose needs to be adjusted when you are sick or under physical or psychological stress to match the natural increase in cortisol levels that would normally occur during these times.

After a serious accident or medical emergency, a cortisone injection may be necessary. Your endocrinologist will discuss this with you and provide written instructions, including providing a sick day management plan.

If you are vomiting or have diarrhoea, your medication will not be absorbed properly. When this happens, you will need to be given a cortisone injection in the muscle and seek urgent medical attention.

Wearing a medical alert bracelet/tag and carrying instructions for emergency steroid treatment is essential. This is very important as low cortisol levels can cause a life-threatening emergency.

MEDICATIONS

Treatment with replacement hormones will require close monitoring by your endocrinologist.

As pituitary hormones interact between themselves and other hormones produced in the body, a fine balance needs to be maintained. Medications will be introduced progressively, and effects are confirmed before moving to the next stage. It could take up to 18 months to finalise the medication regime. This can mean attending check-ups every 2-6 months after treatment begins, then moving to once every year or two years in the longer term.

Some hormone replacement medications need to be adjusted in different situations. This includes when you are sick, have suffered trauma, are stressed, during pregnancy/childbirth/breastfeeding, having surgery/an operation or a marked change in weight. Your endocrinologist will discuss these with you. This can include providing a letter to take to medical procedures or carry with you while you are travelling.

COMMON QUESTIONS

How long will I need to take medication?
If the pituitary tumour or its treatment has affected the function of the pituitary gland, this function does not usually recover and will need to be replaced in the long term and probably for life. This involves daily treatment with a single medication or combination of tablets, patches, gels or injections.

Will I still be able to have a family?
If infertility is a result of hypopituitarism, treatment can restore your sex hormones to normal levels. This can restore your fertility. It is recommended to discuss your desire to have a family with your doctor, as this can affect the choice of medications.

If I take hormone replacement therapy, will I feel the same as I did before my hypopituitarism developed?
Hormone replacement therapy replaces hormones to levels that would occur if your pituitary gland was working normally. However, it is very hard to mimic the natural hormone changes that occur in response to everyday life experiences. Plus, every patient is different so it can take a while to get your hormone balance right. Medications also cause side effects in some people. It is important to discuss how you are feeling with your endocrinologist before adjusting any medications.

What are the long-term implications of having hypopituitarism?
People with hypopituitarism generally require lifetime, daily medication to reduce the risk of developing health conditions caused by missing hormones, such as osteoporosis, heart disease and stroke. Having regular check-ups with your endocrinologist is important to identify any changes needed to your medication as early as possible, to support health and wellbeing.

MORE INFORMATION

The Australian Pituitary Foundation provides social support for patients and carers, and has published a range of patient resources on pituitary conditions and treatments. For more information, please visit our website: www.pituitary.asn.au

Email: support@pituitary.asn.au
Phone: 1300 331 807

REFERENCES

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Acknowlegdement - We are grateful to the members of the Australian Pituitary Foundation for reviewing this information.

Pfizer Australia provided an educational grant to support the production of this material. Pfizer Australia have not reviewed or provided editorial input into its content.