

Type 1 Diabetes

Diabetes Insipidus

Type one diabetes is a disease that affects the pancreas. An organ that is located in the abdomen, that has a primary role of converting food into fuel.¹

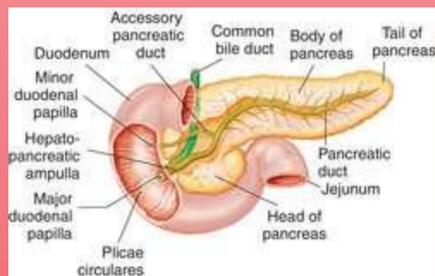


Figure 1: General Anatomy of the Pancreas²

Type one diabetes is found in genetically susceptible individuals by factors of the environment and is considered a chronic autoimmune disorder. The individual's immune system attacks its own beta-cells in the islets of Langerhans of the endocrine pancreas that in turn either destroys or damages the beta cells and destroys the production of insulin eventually.³

Diagnosing Diabetes

When diagnosing a patient with diabetes there are a few tests that can be processed to ensure the doctor is accurate.

- ❖ Look into medical and family history.⁴
- ❖ Potentially perform genetic screening.⁴
- ❖ A physical examination of the skin to check for dehydration.⁴
- ❖ A urinalysis test is performed for any presence of glucose.⁴
- ❖ Blood tests are taken to measure the sodium levels in the blood that help the doctor determine what type.⁴
- ❖ Magnetic resonance imaging (MRI) can be performed on the patient to show any complications that might have happened to the hypothalamus or pituitary gland. When the hypothalamus or pituitary gland is harmed it can lead to diabetes.⁴

Magnetic Resonance Imaging Importance

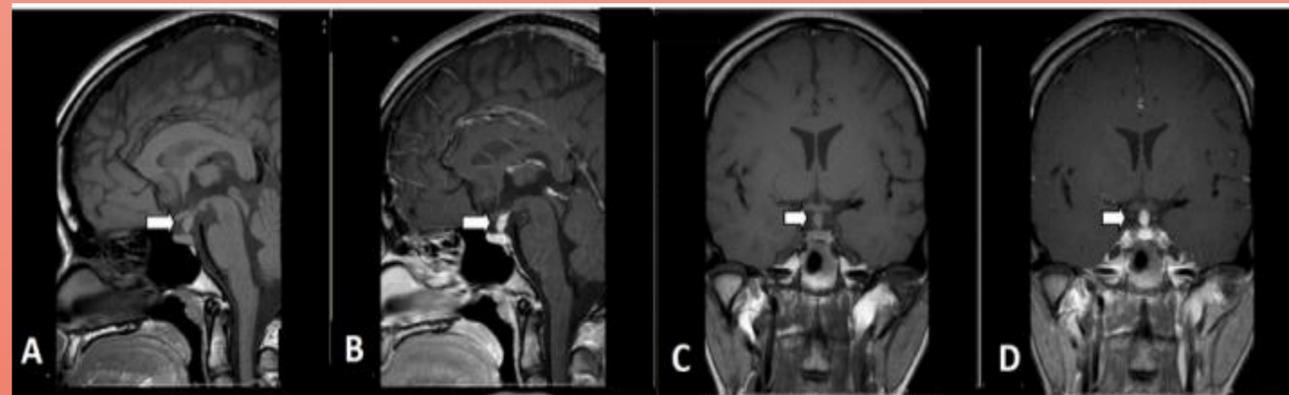
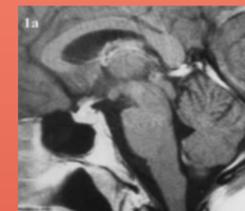


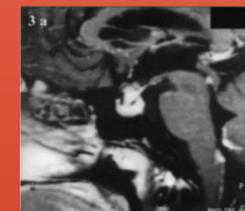
Figure 2. This magnetic resonance image of the pituitary gland shows a thickening of the stalk due to Diabetes Insipidus.⁵

When evaluating the pituitary gland through MRI, there can be enhancement and thickening represented due to diabetes. Untreated diabetes can lead to impaired vision, represented by an enhanced pituitary gland in Figure 3. Isolated neurosarcoidosis seen in Figure 4, can also occur when diabetes goes untreated and an enhanced mass on the pituitary gland will begin to grow. Diabetes may also harm the fourth ventricle of the brain and cause secondary and/or tertiary thyroid insufficiency shown in Figure 5. The thalamus may also be affected along with the frontal lobe, pituitary gland and stalk by untreated diabetes and cause hypogonadism demonstrated by Figure 6.⁶



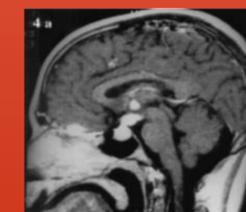
← Figure 3

Figure 4 →



← Figure 5

Figure 6 →



Future of Diabetes Insipidus: Theranostic MRI

There is a new emerging field that can help manage type 1 diabetes. Theranostic MRI, combines modalities of therapy with diagnostic imaging. uses nanometerscale materials to provide a diagnostic insight with treatment. This method will help in the process of transplantation of beta cells for diabetic treatment.⁷

References

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