

Sheehan's syndrome in a man

Raya Almazrouei, Karim Meeran
Imperial College Healthcare NHS Trust

Introduction:

- The blood supply of the pituitary gland comes via a portal circulation from the hypothalamus which carries hypothalamic hormones to their pituitary target.
- During pregnancy, the anterior pituitary gland enlarges but the blood supply cannot increase, as it is derived from a capillary plexus.
- The pituitary is thus vulnerable to arterial pressure changes and infarction secondary to hypotension associated with post partum haemorrhage (PPH), originally described by Sheehan in 1937.
- We describe a case of a male patient with large pituitary adenoma who developed Sheehan's like syndrome due to adenoma infarction secondary to postoperative hypotension, confirming that the mechanism of Sheehan's syndrome is a combination of critical pituitary ischaemia because of its unique blood supply, and relatively mild hypotension, which is not otherwise life threatening.
- The pituitary is thus vulnerable to infarction either in the presence of a tumour or at the end of pregnancy, both times of pituitary enlargement.

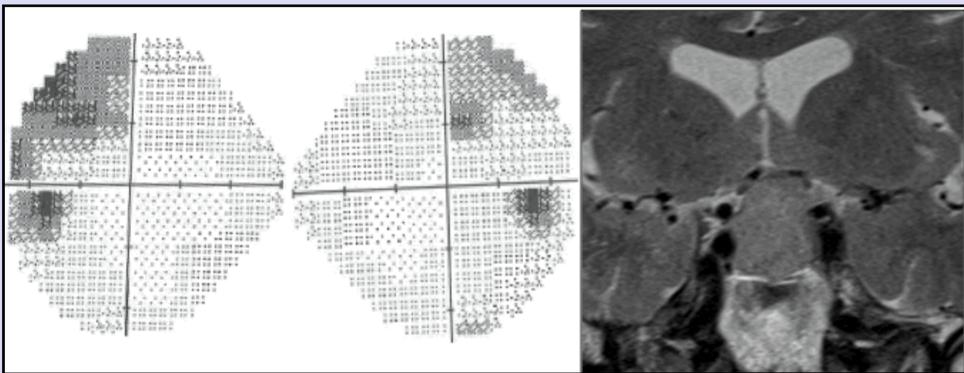


Fig 1. Visual Field on diagnosis in 2014 with T2 image of Pituitary MRI

Table: Hormonal Workup

TSH	0.98 milliunit/L (0.3-4.2)	LH	0.7 IU/L (2-12)
Free T4	7.9 pmole/L (9-23)	FSH	2.6 IU/L (1.7-8)
Cortisol	206 nmol/L	Testosterone	<0.5 nmole/L (10-30)
IGF-1	18.2 nmole/L (6-36)	Prolactin	869 milliunit/L (60-300)

Follow Up:

- His visual field just before the shoulder surgery revealed bilateral hemianopia corresponding to the increase in macroadenoma size (Figure 2).
- In the immediate postoperative period, he vomited 25 times with hypotension and severe visual restriction and required intensive support to maintain his blood pressure.
- He thought his vision temporarily worsened, but did not point this out at the time because he was so unwell following the shoulder procedure.
- After successful resuscitation and stabilization and in view of the change in his visual fields, an MRI pituitary was carried out seven days after the severe hypotension and was reported as pituitary infarction.
- Weeks later, he noticed dramatic improvement in his vision and the prolactin level dropped from peak level of 1095 to 48 milliunit/L (60-300).
- Repeated pituitary MRI showed dramatic reduction in the height of the pituitary macroadenoma due to an infarction (Figure 3). This correlated with the improvement in VF.

References:

- Sheehan HL. Postpartum necrosis of the anterior pituitary. *J Pathol Bacteriol* 1937;45:189-214.
- Halit Diri H, Karaca Z, Tanriverdi F, Unluhizarci K, Kelestimur F. Sheehan's syndrome: new insights into an old disease. *Endocrine* 2016; 51:22-31.
- Berga S, Nitsche J, Braunstein G. Endocrine Changes in Pregnancy. In: Melmed S, Polonsky K, Larsen P, Kronenberg H (eds), *Williams Textbook of Endocrinology*, 13th edn. Philadelphia: Elsevier, 2016:835.
- Biousse V, Newman NJ, Oyesiku NM. Precipitating factors in pituitary apoplexy. *J Neurol Neurosurg Psychiatry* 2001;71:542-545.
- Wildenberg LE, Glezer A, Bronstein MD, Gadelha MR. Apoplexy in nonfunctioning pituitary adenomas. *Pituitary* 2018 ;21:138-144.

Case:

- An 84 year-old male was found to have bilateral upper quadrantanopia on routine eye test by the end of 2014. Subsequent MRI imaging confirmed a large (non-functioning) pituitary macroadenoma associated with chiasmal compression (Figure 1).
- Further hormonal workup with morning sample showed partial hypopituitarism (Table). Hormonal replacement was initiated with levothyroxine (100 mcg), testosterone (1g q 4months) and hydrocortisone (10 and 5 mg).
- The patient was offered a transphenoidal hypophysectomy, but he chose a conservative approach.
- Unfortunately, later on the patient had a fall at home and sustained a left proximal humerus fracture that required internal fixation surgery.
- He then developed a chronic surgical site infection that required repeated orthopaedic washouts and other interventions that were marginally successful (without postoperative complications).
- A follow up pituitary MRI in January 2016 showed an increase in the height of the lesion with increase in chiasmal compression and surgery was again offered to the patient.
- However the patient felt that sorting out his recurrent shoulder problems was more important and he elected to have a major shoulder surgery in April 2017 in another institution before the pituitary surgery.

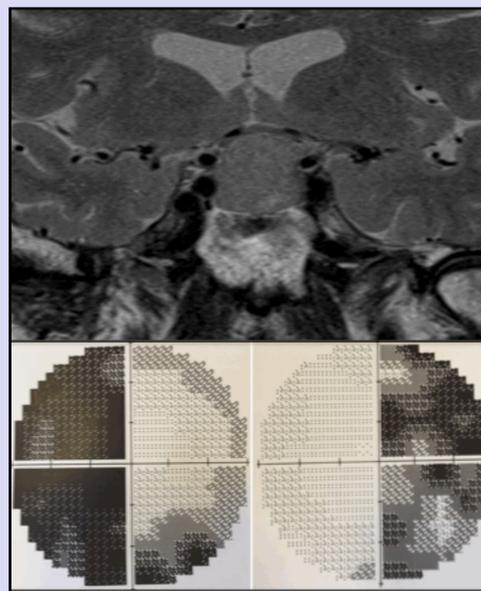


Fig 2. T2 image of Pituitary MRI and Visual Field prior to pituitary infarction

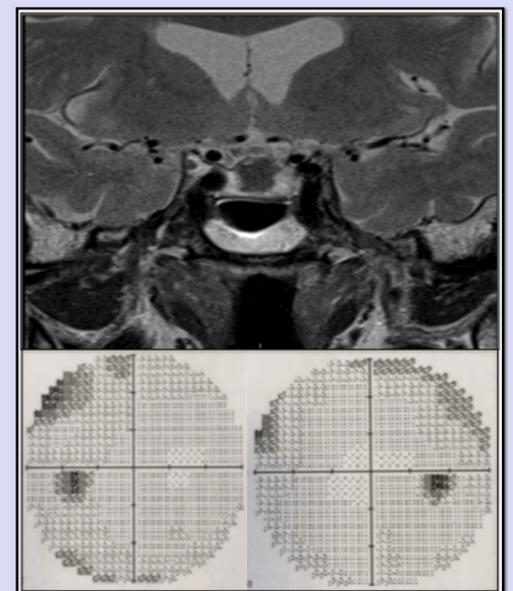


Fig 3. T2 image of Pituitary MRI and Visual Field post pituitary infarction

Discussion:

- Two basic conditions are necessary for the development of Sheehan Syndrome (SS). First, the physiological enlargement of the pituitary gland during pregnancy which is attributable to the 10-fold increase in lactotrophs size and number. Second, is the unique blood flow of the pituitary gland through the hypothalamic-portal circulation.
- This unique pituitary blood supply system allows the hypothalamic hormones to be carried to the anterior pituitary cells directly; however, the blood flow through it cannot increase significantly. Hyperplasia or growth of the anterior pituitary makes the gland critically ischaemic and vulnerable to infarction as a consequence of decrease blood flow with a fall in arterial blood pressure.
- On the other hand, pituitary apoplexy (PA) is defined as hemorrhage or infarction of pituitary adenoma. There are several risk factors predisposing to PA that can be categorized into four groups: reductions in blood flow; acute increases in blood flow; pituitary gland stimulation; and coagulation disturbances.
- Conditions that lead to decrease systemic blood pressure like major surgery, specifically cardiac and orthopaedic surgeries can result in blood supply reduction and infarction to the pituitary adenoma as a sequence.
- This concept is applied to our patient who had large pituitary adenoma that behaves in a similar manner to the enlarged pituitary at the end of a normal pregnancy. The added insult of hypotension causes infarction of either the enlarged normal pituitary or the pituitary adenoma.
- While in the case of SS, the decrease blood flow is mainly precipitated by PPH, in our patient it is due to anesthesia and major shoulder surgery-associated hypotension leading to pituitary gland or pituitary adenoma infarction consecutively.