Case 10794

Pituitary stalk transection syndrome
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Section: Neuroradiology
Area of Interest: Head and neck
Procedure: Screening
Imaging Technique: MR
Special Focus: Endocrine disorders Case Type: Clinical Cases
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Patient: 2 years, male

Clinical History:

Child presented with behavioural changes, delay in achieving mile stones and short stature. Hormonal assay showed growth hormone deficiency.

Imaging Findings:

T1W1 MR imaging (Fig. 1, 2): Pituitary gland appears smaller than normal with absent posterior pituitary bright spot (PPBS). Lower half of stalk appears thinner (0.9 mm) and isointense, while the upper half of pituitary stalk is T1 hyperintense. On post contrast images, the lower half of stalk is non-enhancing (Fig. 3).

Discussion:

Disease description

Pituitary stalk transection syndrome should be suspected when there is lack of pituitary stalk visibility and hypoplasia of the anterior hypophysis in a patient clinically presented with features of isolated growth hormone deficiency (IGHD) or multiple pituitary hormone deficiency (MPHD) [1].

Aetio-pathology

Various hypotheses have been proposed to explain the pituitary stalk transection syndrome:
1. Ischaemic insult to the pituitary stalk occurring because of trauma during breech delivery [2]
2. Head trauma associated with breech delivery causes mechanical rupture of the pituitary stalk as the stalk is stretched between the pituitary gland and the mobile brain [3, 4]
3. Congenital hypoplasia or dysplasia of the pituitary gland is the cause of hypo-pituitarism. There is early fetal mal-development of mid-line structures, which results in failure of the neurohypophysis and its investing vascular plexus to descend completely into sella tursica. Anterior lobe hypoplasia and dysfunction result in decreased hormone secretion, which in turn results in increased incidence of breech presentation [3, 4].

Clinical perspective

Clinically isolated growth hormone deficiency may progress to multiple pituitary hormone deficiency [5]. Such progression cannot be predicted reliably on the basis of clinical and laboratory findings. However, MR imaging can
be used to study the anatomic details of the pituitary-hypothalamic region. It has been shown that idiopathic growth hormone deficiency can result in an abnormal appearance of the hypothalamus or pituitary gland on MR images [6]. Such anatomic details can be useful when predicting whether clinical isolated growth hormone deficiency has the potential to progress to multiple pituitary hormone deficiency [7].

Imaging perspective

T1-weighted MR imaging: Small anterior pituitary gland with an absent posterior pituitary bright spot and a thin or absent pituitary stalk. Ectopic posterior pituitary gland bright spot seen as an area of high signal intensity in the midline at the median eminence or in the upper half of the stalk. A truncated or thin pituitary stalk is highly indicative of isolated growth hormone deficiency. T1W1 Fatsat sag images are useful in distinguishing clival fat from PPBS. Contrast enhanced T1-weighted MR imaging: Visualization of an enhancing stalk on post-contrast images of patients with IGHD indicates partial preservation of the hypothalamo-hypophyseal portal vessels, and non-visualization in most patients with MPHD indicates progression of disease.

Teaching point

Patients with imaging characteristics indicative of MPHD need to undergo repeated assessment of pituitary function [9]. Progression to complete anterior pituitary hormone deficiency may occur, even during the 2nd or the 3rd decade of life [8].

Differential Diagnosis List: Pituitary stalk transection syndrome, Posterior pituitary ectopia, Empty sella

Final Diagnosis: Pituitary stalk transection syndrome

References:

**Description:** Small-sized pituitary gland with absent posterior pituitary bright spot and ectopic posterior pituitary bright spot (arrow) **Origin:** Department of Radiology, Amrita Institute of Medical Sciences, Kochi, Kerala, India
Figure 2

Description: Lower half of stalk appearing thinner than the upper half (arrow)

Origin: Department of Radiology, Amrita Institute of Medical Sciences, Kochi, Kerala, India.
Figure 3

*Description:* Post contrast T1W1 imaging showing non enhancing thinner lower half of stalk (arrow).
*Origin:* Department of Radiology, Amrita Institute of Medical Sciences, Kochi, Kerala, India.