Although the use of CRH is the standard of practice, it is currently unavailable in the USA and desmopressin provides reliable results with no additional observed side effects [1].

In most of the studies with BIPSS, CRH has been used to stimulate corticotrophs. Besides CRH, injection desmopressin in combination with CRH or alone has also been used alone for stimulation of corticotrophs during BIPSS with satisfactory results [2] [3].

Case series

2017

Feng et al. retrospectively analyzed 91 patients with Cushing's syndrome who had either negative findings on Dynamic contrast enhanced MR imaging of the pituitary gland or non-suppressed high dose dexamethasone suppression tests (HDDST). Thin-slice thoracoabdominal computed tomography (CT) and octreotide scan were also negative to rule out ectopic adrenocorticotropin hormone (ACTH) syndrome. All patients went through inferior petrosal sinus sampling (IPSS) with desmopressin. Afterwards, transsphenoidal pituitary surgery, light microscope pathology and immunohistological staining for ACTH were performed in all patients.

1. Diagnosis of Cushing's disease (CD). Among the 91 patients included, 90 were confirmed with CD, of whom 89 had positive IPSS findings, therefore the sensitivity was 98.9%. The one patient who was negative for CD also had negative IPSS findings, therefore the specificity was 100%. 2. Tumour lateralization. Among the 51 patients who were ultimately diagnosed with CD and whose lateralization by IPSS and surgery was either left or right, 37 had IPSS lateralization in concordance with surgery, therefore the concordance rate was 72.5%. Patients in the concordant group had a higher frequency of right lateralization by surgery.

IPSS with desmopressin is a sensitive approach in the diagnosis of CD and has moderate accuracy in tumour lateralization, making it an alternative choice to IPSS with CRH [4].

2016

A total of 331 BIPSS procedures were performed in 327 patients (254 F, 73 M), mean age 41 (range 7-81) years. The overall technical success rate was 88% for bilateral cannulation, though nearly two-thirds of the technical failures had unilateral sampling that diagnosed CD. Of the 331 BIPSS procedures, 40 were performed without, and 291 with stimulation by Acthrel or desmopressin. Sensitivity was 89-94% for unstimulated BIPSS, 96% for stimulated BIPSS, and 77% for MRI. BIPSS lateralization was accurate in about half of patients, compared with 75% accuracy for MRI. Mean inferior petrosal sinus (IPS):peripheral adrenocorticotropic hormone ratio was 17.3 (SE 1.8) at baseline, and 99.2 (SE 14.8) at 3 min, with decreasing values over time. All patients with follow-up after surgical resection for centralizing BIPSS were reported to be cured, with cortisol levels significantly decreased from 19 to 4 µg/dL ($p<0.0001$). Complications from BIPSS were rare, including groin hematoma (2.5%), but no thromboembolic complications were seen.

BIPSS remains the 'gold standard' for diagnosing CD. Stimulation with Acthrel or desmopressin is key to increasing specificity. When only one IPS can be successfully cannulated, results may still be diagnostic. BIPSS findings cannot be used to accurately lateralize lesions within the pituitary [5].

Feng et al retrospectively reviewed 79 cases of Cushing's disease with negative MRI in the Department of Neurosurgery of Peking Union Medical College Hospital from August 2012 to August 2014.Of the 79 patients, 58 underwent IPSS.There were 16 males and 42 females in this study, with age 12 to 65 years old.All 58 patients underwent endocrine assessment before transsphenoidal surgery, and pathology specimens were examined.

The IPSS results of all the 58 patients suggested the excessive secretion of ACTH was from pituitary.Of the 58 patients, visible tumor was found in 56 cases during intraoperative exploration (96.6%). In 29 (50%) cases, the sideof pituitary where tumor was located predicted by IPSS was the same with intraoperative exploration.Typical tumorwas seen in 47 cases during exploration, and the endocrine remission rate was 83.0% after operation.Suspicious tumor was seen in 9 cases, and endocrine response rate was 44.4%.No tumor was found in two caseswhohad no remission after operation.pituitary neuroendocrine tumor was confirmed in 41 patients (70.7%) by pathological exam.And anterioror posterior lobe of pituitary was reported in 12 cases, pituitary hyperplasia in 5 cases.

IPSS is recommended in Cushing's disease patients with negative MRI, and it is helpfulto judge whether the excessivesecretion of ACTH is from pituitary, whileits value in predicting the lateralization of tumor is low.If IPSS results are positive, transsphenoidal surgery should be performed [6].

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