

Kiran et al from the Aga Khan University Hospital, Stadium Road, [Karachi, Pakistan](#) conducted a cross-sectional retrospective study on 115 patients after ethical approval. Patients were 16 years old or older undergoing [pituitary](#) or [sellar](#) surgeries. They collected data on basic sociodemographic characteristics and clinical indication for surgery. They noted laboratory values for serum [electrolytes](#), [plasma](#) and urine osmolality, urine sodium and 24-hour fluid balance from immediate postoperative day till discharge and follow up. They recorded medical management plans. They also recorded Diabetes insipidus (DI), [Syndrome of inappropriate antidiuretic hormone secretion](#) (SIADH), [cerebral salt wasting syndrome](#) (CSW), triphasic response and hyponatremia according to the diagnostic definitions. Finally they performed data analysis on [SPSS](#) version 19.0.

Out of 115 patients there were 61.7% males, mean age  $42.3 \pm 13.86$  years, 91.3% had [pituitary neuroendocrine tumor](#) (73.0% non-functioning) and 86.1% underwent transsphenoidal surgical approach. Transient DI occurred from Day 1 to 6, peaking with 57.4% on Day 2. Permanent DI and SIADH were rare. We did not note typical triphasic response and cerebral salt wasting in any of the patients. However, isolated hyponatremia occurred in 11% and 20.9% had diabetes insipidus with hyponatremia.

Transient diabetes insipidus is the most common postoperative sodium and water disturbances (SWD) after sellar, suprasellar and parasellar surgery (SSPS). [Hyponatremia](#) occurred alone and following DI. This is the first study describing postoperative sodium and water disturbances after different sellar surgeries in [Pakistan](#) <sup>1)</sup>.

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Hayashi et al from the Department of Neurosurgery, Graduate School of Medical Science, Kanazawa University, Kanazawa, Ishikawa, [Japan](#), conducted a retrospective study with 172 patients undergoing TSS for sellar tumors from 2006 to 2014. Sequential T1-weighted MR images without enhancement were evaluated for HI in the [pituitary stalk](#) and the posterior lobe to assess the localization of ADH before and at intervals after TSS. DI was assessed pre- and postoperatively. HI in the pituitary stalk showed the following morphology: (1) ovoid in the distal end of the pituitary stalk (group A), (2) linear in the distal part of the pituitary stalk (group B), (3) linear in the whole pituitary stalk (group C).

Preoperative DI occurred in 6 patients (3.5 %) with no HI observed in the posterior lobe. Postoperative DI was transient in 82 patients (47.7 %), and permanent in 11 (6.4 %). One week after surgery, HI was absent in the posterior lobe in 74 patients (43.0 %), and present in the pituitary stalk in 99 patients (57.6 %); both were significantly correlated with postoperative DI ( $p < 0.001$ ). The absence of HI in the posterior lobe (A, 48.9 %; B, 68.3 %; C, 92.3 %), persistence of DI (A, 3.7 days; B, 45.9 days; C, 20.5 months), and duration until HI recovery in the posterior lobe (A, 3.6 months; B, 6.8 months; C, 22.9 months) were greatest in group C, followed by group B, and then group A. Fourteen group A patients did not have postoperative DI despite having HI in the pituitary stalk and the posterior lobe. Four group C patients developed permanent DI with persistence HI in the pituitary stalk.

HI in the pituitary stalk and its absence in the posterior lobe indicated postoperative DI, which was transient if HI was detected in the pituitary stalk. DI duration could be predicted by the length of HI in the pituitary stalk, which corresponded to the degree of ADH transport obstruction <sup>2)</sup>.

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The files of 24 patients that underwent neurosurgery for sellar lesions, or tumor near the hypothalamus or pituitary gland at the Department of Neurosurgery, King Abdulaziz University Hospital, [Jeddah](#), Kingdom of Saudi Arabia were retrospectively reviewed between January 2011 to December 2014. A total of 24 patients were studied, and were divided into 2 groups namely; DI and

non-DI. Patient characteristics were studied using descriptive statistics. The differences in proportion between the 2 groups were found out using Z-test for proportion in 2 populations. The mean differences in the hormonal abnormalities for the 2 groups were assessed using independent t-test. All statistics are considered statistically significant when p less than 0.05.

During hospitalization, 13 (54.2%) out of 24 patient that underwent neurosurgery had manifestations of DI, which was transient in 5 (38.8%) and permanent in 8 (61.2%). The DI subgroup contained higher prevalence of prolactinoma, craniopharyngioma, pre-operative panhypopituitarism, and macroadenoma in MRI imaging and transphenoidal surgery. Furthermore, urine osmolality was significantly lower in the DI group post-operatively with a significant  $p=0.023$ . It was recognized that the permanent DI documented more significant numbers than other studies.

In the study group, it was recognized that permanent DI meant that our patients needed desmopressin for more than 3 months, which documented a more significant number than other studies <sup>3)</sup>.

## 2009

Fifty-seven patients (mean age 55 years, 61.4% females) harbored 30 clinically hormone-inactive and 27 hormone-secreting pituitary neuroendocrine tumors. Postoperative WED occurred in 75.4% of the patients: in 38.5% as isolated diabetes insipidus (DI); in 21% as isolated hyponatremia; and in 15.7% as combined DI-hyponatremia. The maximum of medians of diuresis (5.750 L) in patients with isolated DI occurred on postoperative Day 2. Nadir of medians of hyponatremia (132 mmol/L) in patients with isolated hyponatremia occurred on postoperative Day 9. In patients with combined DI-hyponatremia, maximum of medians of diuresis (5.775 L) occurred on the 2nd day and nadir of medians of hyponatremia (130 mmol/L) on the 10th postoperative day. Altogether, 8.7% of the patients had to be treated with desmopressin because of DI persisting for >3 months. Of all the patients with hyponatremia, 42.8% were treated by transient fluid-intake restriction due to an IH of <130 mmol/L with or without clinical symptomatology. Transient acute renal failure occurred in one of these patients. Generally, the occurrence of postoperative WEDs was linked to the intraoperative manipulation of the neurohypophysis. Increased thirst correlated significantly with DI ( $p=0.001$  and  $0.02$ , respectively) and decreased thirst with the hyponatremic episode in patients with combined DI-hyponatremia ( $p=0.003$ ). Decreased urine osmolality correlated significantly with the presence of DI ( $p=0.023$ ). Electrolyte-free water clearance and urinary  $\text{Na}^+$  excretion were not correlated with DI and hyponatremia. Antidiuretic hormone was not suppressed during hyponatremia.

Water and electrolyte disturbances occurred in the majority of patients undergoing transsphenoidal adenomectomy and were usually transient. Diabetes insipidus is more frequent than hyponatremia. Diabetes insipidus usually occurs during the 1st postoperative day and resolves in the majority of cases within 10 days. In few patients, DI may persist and require therapy with ADH analogs. Hyponatremia usually occurs at the end of the 1st postoperative week and resolves in most cases within 5 days. Very few patients will need treatment other than fluid-intake restriction to avoid serious complications. Thus, careful monitoring of the WEDs in patients undergoing transsphenoidal pituitary neuroendocrine tumor surgery is mandatory for the first 10 postoperative days <sup>4)</sup>.

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Kiran Z, Sheikh A, Momin SN, Majeed I, Awan S, Rashid O, Islam N. SODIUM AND WATER IMBALANCE AFTER SELLAR, SUPRASELLAR AND PARASELLAR SURGERY. *Endocr Pract.* 2016 Dec 14. [Epub ahead of print] PubMed PMID: 27967227.

2)

Hayashi Y, Kita D, Watanabe T, Fukui I, Sasagawa Y, Oishi M, Tachibana O, Ueda F, Nakada M.

Prediction of postoperative diabetes insipidus using morphological hyperintensity patterns in the pituitary stalk on magnetic resonance imaging after transsphenoidal surgery for sellar tumors. Pituitary. 2016 Dec;19(6):552-559. PubMed PMID: 27586498.

3)

Qari FA, AbuDaood EA, Nasser TA. Diabetes insipidus following neurosurgery at a university hospital in Western Saudi Arabia. Saudi Med J. 2016 Feb;37(2):156-60. doi: 10.15537/smj.2016.2.12848. PubMed PMID: 26837398; PubMed Central PMCID: PMC4800914.

4)

Kristof RA, Rother M, Neuloh G, Klingmüller D. Incidence, clinical manifestations, and course of water and electrolyte metabolism disturbances following transsphenoidal pituitary neuroendocrine tumor surgery: a prospective observational study. J Neurosurg. 2009 Sep;111(3):555-62. doi: 10.3171/2008.9.JNS08191. PubMed PMID: 19199508.

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