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Rare Co-Presentation of Acute Sheehan's Syndrome with Central Diabetes Insipidus: A Case Report

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Abstract

Sheehan's Syndrome (Ss) is a Rare but Serious Postpartum Complication, Generally Characterized by Anterior Pituitary Hypofunction Due to Postpartum Hemorrhage or Shock. While Diabetes Insipidus (Di), Related to the Dysfunction of Posterior Pituitary Hormone Production, Is Seldom Associated With Ss, This Case Report Highlights An Exceptionally Rare Instance Of Simultaneous Central Di And Panhypopituitarism In A Multiparous Woman. It Underscores The Intricacy Of Such Cases And The Critical Need For Accurate Diagnosis Following Severe Postpartum Hemorrhage.

Keywords: Sheehan's Syndrome, Diabetes Insipidus, Acute, Panhypopituitarism

Introduction:

Sheehan's syndrome occurs due to ischemic damage to the anterior pituitary gland following severe postpartum bleeding. This condition results in varying degrees of hormonal deficiencies, from the lack of a single pituitary hormone to complete hypopituitarism. The disorder can manifest acutely within six weeks after childbirth (the puerperium) or develop years later. A rare but notable complication is central diabetes insipidus. This report provides an in-depth examination of a case involving a woman with SS and central DI.

Case presentation:

A 35-year-old woman with a history of multiple pregnancies and no prior health issues delivered a baby girl at 38 weeks of gestation. The vaginal delivery was complicated by severe bleeding caused by uterine inertia. Following the delivery, she experienced hemorrhagic shock, with an elevated respiratory rate of 30 breaths per minute and an undetectable blood pressure. Physical examination showed stupor, pallor, dehydration symptoms like hollow eyes and skin folds. She was admitted to intensive care for urgent treatment, including aggressive fluid replacement, blood transfusions, platelet administration, and noradrenaline therapy to stabilize blood pressure, which gradually improved her condition.

Her post-delivery symptoms included fever, weakness, psychomotor delay, and an inability to breastfeed. She was diagnosed with adrenal insufficiency based on low morning cortisol levels (4.2 µg/dL) and promptly received intravenous hydrocortisone. However, on postpartum day 30, she developed excessive urination, producing around 6000 ml of urine daily. Clinical suspicion of Sheehan's syndrome complicated by central diabetes insipidus (DI) prompted further endocrine assessments.

Testing confirmed multiple hormonal deficiencies, including adrenal insufficiency, central hypothyroidism, low prolactin levels, and hypogonadotropic hypogonadism. Evaluation of her polyuria and polydipsia revealed serum sodium levels of 143 mEq/l and low urinary osmolarity (157 mOsm/l), consistent with DI. MRI of the hypothalamic-pituitary region revealed pituitary necrosis and the absence of the T1 hypersignal from the posterior pituitary, confirming Sheehan's syndrome with central DI. Hormone replacement therapy, including hydrocortisone, l-thyroxine, and desmopressin, resulted in significant clinical improvement and stabilization of her condition.

Discussion:

SS is a rare pituitary disorder linked to pregnancy, distinct from lymphocytic hypophysitis and silent pituitary adenoma, and is infrequent in developed nations [1]. For instance, its prevalence in Iceland decreased from 10-20 per 100,000 women half a century ago to 5.1 per 100,000 by 2009. Approximately 5% of Sheehan's syndrome patients develop DI [2].

This syndrome often involves structural damage to the posterior pituitary gland and hypothalamic neurons, impairing antidiuretic hormone secretion [3]. DI typically arises when significant neurohypophysis damage occurs, and the severity of polyuria is correlated with the functional capacity of the anterior pituitary gland [4]. Studies indicate reduced urinary concentration ability in patients with gradual postpartum hypopituitarism, further supporting partial DI prevalence among these patients [5].

A study by Gregor Leonhard and colleagues reviewed nine cases of acute Sheehan's syndrome with DI. Patient ages ranged from 24 to 45 years, with a median age of 30.2. Delivery modes varied, with an equal number of caesarean and vaginal births (table 1) [6]. Symptom onset ranged from 24 hours to 19 days postpartum, with a median of 7.8 days (table 1) [6], contrasting with our case, where symptoms appeared 4 weeks after delivery.

Hormonal deficiencies were common and included adrenal insufficiency (n=6), hypogonadism(n=6),hypothyroidism (n=5), somatotropic axis failure (n=2), and panhypopituitarism (n=2) [6]. Prolactin levels were typically low, though elevated levels occurred in two severe cases leading to chronic kidney disease (table 1) [7]. In our case, only the first three hormonal deficiencies were reported with a low prolactin level.

MRI or CT imaging is recommended for Sheehan’s syndrome with DI to exclude other diagnoses such as adenomas or inflammatory changes [8]. In six patients, imaging findings typically show pituitary necrosis (figure 1) and loss of the T1 hypersignal in the posterior pituitary (table 1) [6]. As in these cases, pituitary MRI was also performed in our patient, and showed pituitary necrosis, as well as disappearance of the T1 hypersignal of the post pituitary gland.

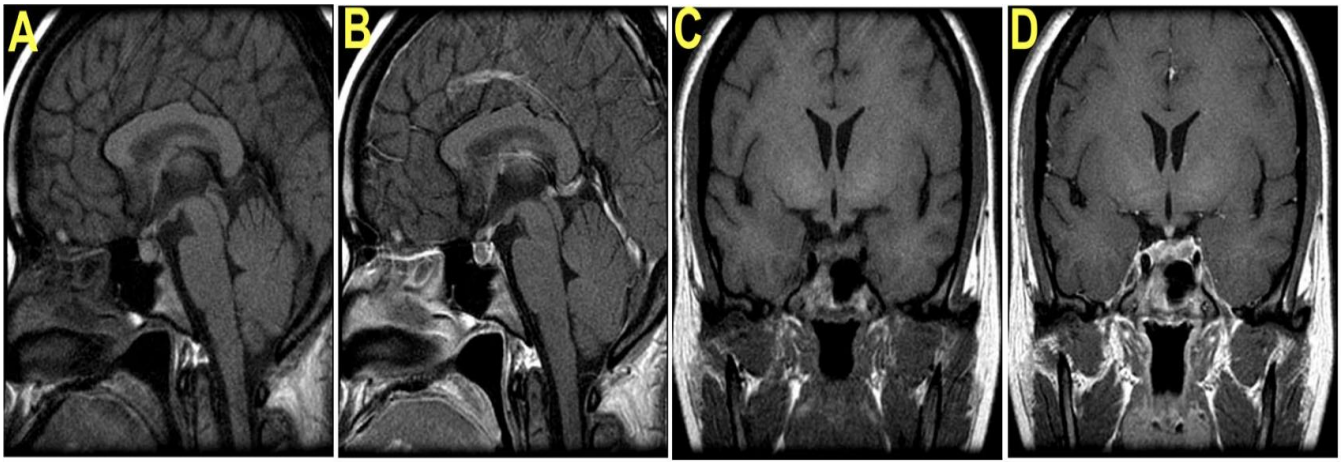

Figure 1: MRI of the hypothalamic-pituitary region showing pituitary necrosis and slight pituitary heterogeneous signal [9].

(A)sagittal view without gadolinium contrast medium and (B) with gadolinium contrast medium (C)corneal view without gadolinium contrast medium and (D) with gadolinium contrast medium

The diagnostic process for hypotonic polyuria increasingly emphasizes the role of copeptin measurements, especially when using hypertonic saline stimulation, which has been found to be more accurate than the water-deprivation test [10]. A structured algorithm now incorporates various methods, including clinical evaluations, baseline measurements of plasma sodium and osmolarities, and responses to dehydration and desmopressin administration, alongside basal and stimulated copeptin levels [11].For nephrogenic diabetes insipidus (DI), a basal copeptin level exceeding 21.4 pmol/L confirms the diagnosis [10]. If copeptin is below this threshold, an arginine stimulation test is recommended, central DI is diagnosed if the copeptin level post-arginine stimulation is less than 3.8 pmol/L, while primary polydipsia is identified when it exceeds 3.8 pmol/L [10]. In our patient, copeptin assay was not conducted due to lack to availability in our context.

Seven patients were treated with desmopressin for diabetes insipidus in the context of SS (table 1) [6]. Desmopressin remains the primary treatment for DI during pregnancy and postpartum, requiring empirical dosing and regular monitoring of clinical symptoms and serum and urinary osmolarity[12]. In our case, the patient showed significant improvement after initiating desmopressin therapy.

Table 1: Comparison of case characteristics summarized in the work of Gregor Leonhard and his team:

Patients	1	2	3	4	5	6	7	8	9	Our patient
Patient age (years)	28	24	45	36	-	32	32	32	43	35
Mode of delivery	Vaginal	C-section	Vaginal	Vaginal	-	C-section	C-section	Vaginal	C-section	Vaginal
Interval from birth to symptom onset	24 h	11 days	15 days	4 days	2 days	19 days	24 h	3 days	15 days	30 days
Polyuria	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Symptoms										
Headache	Yes	Yes	Yes	-	Yes	-	-	Yes		
Agalactorrhea	Yes	Yes	Yes	-	Yes	-	-	Yes		Yes
Fatigue	-	Yes	-	-	-	-	-	Yes		
Hormone disorders										
Adrenal insufficiency	Yes	Yes	Yes	-	-	Yes	-	Yes	Yes	Yes
Hypothyroidism	Yes	Yes	Yes	-	-	Yes	-	No	Yes	Yes
Hypoprolactinemia	No	Yes	Yes	Yes	-	No	-	Yes	-	Yes
Hypogonadism	Yes	Yes	Yes	-	-	Yes	-	Yes	Yes	Yes
Somatotropic axis failure	-	-	-	-		-	-	Yes	Yes	-
Prolactin level	Elevated	Low	Low	Low	-	Elevated	-	Low	-	Low
Brain MRI	Yes	Yes	Yes	-	Yes	-	-	Yes	Yes	Yes
DI treatment	Desmopressin					-	Desmopressin		-	Desmopressin

Follow-up evaluations were conducted for four of the eight patients described in Gregor Leonhard's study. One of these patients remained clinically stable, while all the others required ongoing desmopressin therapy 10, 12, and 24 months after delivery [6]. In our case, the patient's follow-up visits included clinical and biological assessments. Over time, her condition showed a significant improvementin the polyuria-polydipsia syndrome and normalization of her ionogram. These findings underscore the importance of continued monitoring and treatment for SS complications like central SI.

Conclusion:

Sheehan's syndrome is an uncommon consequence of postpartum hemorrhage. Though central diabetes insipidus is not frequently observed, it should be considered in cases where patients exhibit symptoms like polyuria and polydipsia. Additionally, the possibility of requiring prolonged hormonal replacement therapy must be carefully evaluated in the management of this condition.

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