RESEARCH PAPER | Medical Science | Volume : 6 | Issue : 5 | May 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 74.50

A Rare Case of Central Diabetes Insipidus in Pregnancy

KEYWORDS: polyuria, Diabetes insipidus , Pregnancy

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ABSTRACT *A 30yr old primi at 29wks of gestational age was referred to us with altered sensorium since one day & past history of polyuria, polydipsia since childhood. She had no focal neurological signs, hemodynamically stable with sodium 191 meq/L, potassium 4.4meq/L, Urine, serum osmolality 44 and 390 mOsm/L, respectively. Her urine output in hospital was 4.5 to 12.5 lit/day. She responded well with desmopressin and delivered a 1.55kg female child by LSCS at 32wks due to severe oligohydramnios. MRI brain showed absent bright spot. Diabetes insipidus is rare in pregnancy though pregnancy itself can worsen the condition. Diabetes Insipidus is either due to arginine vasopressin deficiency (central) or due to tubular unresponsiveness (nephrogenic). Our patient is a case of central diabetes insipidus whose symptoms are improved well with desmopressin therapy.*

Introduction:

Though it is a rare disorder, diabetes insipidus was first described in the 18th century[1]. Diabetes insipidus (DI) is either due to deficient secretion of arginine vasopressin (AVP), also known as antidiuretic hormone(ADH) by the pituitary gland (central diabetes insipidus) or due to renal tubular unresponsiveness to AVP (nephrogenic DI). This leads to polyuria, polydipsia with hyposthenuria, causing dehydration and hypernatremia if the patient is deprived of water[2]. Deficiency of AVP secretion is referred to as central DI, pituitary DI, or neurohypophyseal DI. About 50% of central DI cases are idiopathic[3]. The age of presentation is dependent on the etiology, it can present at any age, and the prevalence is equal among males and females although there is one study showing higher prevalence in the males[4]. A third etiology had been described in the pregnant patient known as the gestational diabetes insipidus. This is a rare condition occurring in 2-4 cases per 100,000 deliveries[5]. Secondary deficiencies of AVP secretion resulting from inhibition by excessive intake of fluids known as primary polydipsia[6]. The ability of the CNS to produce AVP and of the kidney to respond to it should be established by means of a formal water deprivation test and a desmopressin (DDAVP) trial[7]. MRI of the brain can be used to differentiate pituitary DI from primary polydipsia[6]. In patients with central DI, desmopressin is the drug of choice[8,9].

CASE REPORT;

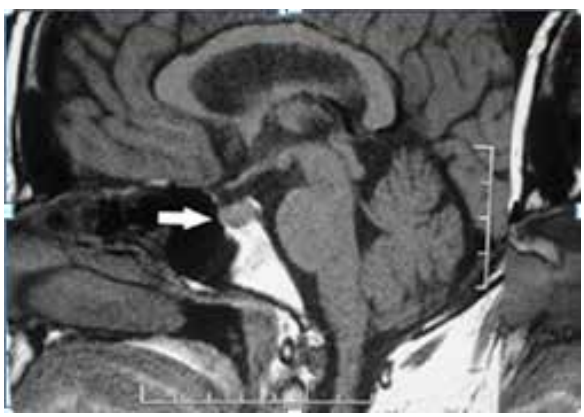
A 30yr old pregnant woman was referred to our division because of altered sensorium since one day. She had no history of headache or vomitings. At the time of consultation, the patient was primi with 29wks of gestational age and being followed by an obstetrician. She had a past history of polyuria and polydipsia started at the age of 1yr. She used to drink an average of 10 to 14 litres of water per day and had adjusted her life in such a way that she always had access to drinking water. Her medical history was otherwise unremarkable. She had no symptoms of neurological or psychiatric illness, nor a history of head trauma. She had menarche at the age of 12yrs, with regular menstrual cycles. Her family history was unremarkable. On examination, blood pressure was 140/90 mmHg; heart rate 88/min. She was in altered sensorium without any focal neurological signs, reflexes were judged to be normal and uterine size corresponded to the period of gestation (confirmed by ultrasound). Ultrasound showed oligohydramnios. Fundoscopy was normal. Her urine output during the hospital stay ranged from 4.5 to 12.5lit/day. Her laboratory investigations showed Hb 8.3g/dl, (microcytic hypochromic anemia), TC:7600cell/cumm, platelets:160,000/cumm, RBS:110mg/dl, serum sodium:191meq/L, potassium: 4.4 meq/L, and chloride:121meq/L. Liver and renal function tests were normal; total bilirubin:0.6mg/dl, AST:29 IU/L, ALT: 15 IU/L, ALP: 127 IU/L; serum creatinine:0.5mg/dl, BUN:12mg/dl, serum uric acid:3.7mg/dl; A dipstick urine test was negative for protein. The specific gravity of the urine was 1.005 and Urinary and plasma osmolality were 44 and 390mOsm/L, respectively. Thyroid function was normal (TSH: 1.48 mIU/L; FT3: 2.96pg/mL; FT4: 0.87ng/dL;). Her basal plasma ADH was 0.58pg/ml. As patient was pregnant, water deprivation test was not done. Pituitary MRI could not be obtained, as the patient being concerned regarding the exposure of the fetus to the contrast material. Because of the worsening clinical condition of the patient, and considering the results of urine relative hyposmolality and serum hypertonicity, oral desmopressin 0.1mg twice daily was administered with close monitoring of fluid balance, weight, pulse rate, blood pressure and frequent measuring of the serum sodium, and serum and urine osmolalities. Recovery was uneventful and she responded appropriately to desmopressin therapy. Her polyuria and polydipsia reduced and serum sodium was 147meq/L. Her 24hr urine volume 4500ml and protein was 1.3g/dl. She was discharged and scheduled for weekly follow ups. One week later she admitted for cesarean section due to severe oligohydramnios and delivered a female child with 1 minute Apgar score 7 and birth weight 1.55kg. MRI of the brain showed a normal-sized pituitary gland with no fo-

Volume : 6 | Issue : 5 | May 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 74.50

cal lesions and homogenous enhancement, no other focal parenchymal lesions. The posterior pituitary hyperintensity was not visualized on T1-weighted sequence. With the clinical history and investigation results, a diagnosis of central diabetes insipidus was made.

After delivery she needed a dose of 0.1mg desmopressin thrice daily, later her urine out put was dropped to 2500ml/day, she was discharged with intranasal desmopressin at a dose of 20mcg/day in 2 doses.

Figure 1: MRI of the patient showing absence of posterior pituitary bright spot.



DISCUSSION;

Diabetes insipidus is a rare disease with a nonunivocal reported prevalence of 1:25,000[10]. DI, is a syndrome characterized by the production of abnormally large volumes of dilute urine. The 24hr urine volume exceeds 50mL/kg bodyweight, and the osmolarity is less than 300mosmol/L. A primary deficiency of AVP secretion usually results from agenesis or irreversible destruction of the neurohypophysis. It is referred to variously as neurohypophyseal DI, neurogenic DI, pituitary DI, cranial DI, or central DI. Primary deficiencies in the antidiuretic action of AVP result in nephrogenic DI. Secondary deficiencies of AVP secretion result from inhibition by excessive intake of fluids. They are referred to as primary polydipsia. A primary deficiency of plasma AVP also can result from increased metabolism by an N-terminal aminopeptidase produced by the placenta. It is referred to as gestational DI because the signs and symptoms manifest during pregnancy and usually remit several weeks after delivery[6]. The occurrence of diabetes insipidus with pregnancy is considered to be rare, with the incidence estimated to be from 2 to 4 of every 100,000pregnancies[11]. The mechanism of occurrence of gestational diabetes insipidus is attributed to the vasopressinase activity elaborated by the placental trophoblast and reaches maximal activity sometime during the 22nd to 24th week of gestation[5,12,13]. The vasopressinase is a cystine aminopeptidase which increases the catabolism of vasopressin four-folds1.Its activity is proportional to the placental weight[12]. During pregnancy, diabetes insipidus is associated with oligohydramnios, preeclampsia, and even hepatic dysfunction. Measurement of the amniotic fluid index can be carried out to identify oligohydramnios that may occur during GDI[14]. The ability of the CNS to produce AVP and of the kidney to respond to it should be established by means of a formal water deprivation test and a desmopressin trial[7]. MRI of the brain can be used to differentiate pituitary DI from primary polydipsia. In most healthy adults and children, the posterior pituitary emits a hyperintense signal visible in T1-weighted midsagittal images. This "bright spot" is almost always present in patients with primary polydipsia but is always absent or abnormally small in patients with pituitary DI, even if their AVP deficiency is partial[6]. In the present patient, primary polydipsia was eliminated by the findings of increased serum osmolality and hypernatremia, while the response to dDAVP excluded nephrogenic diabetes insipidus. With the clinical history and investigation results, a diagnosis of central diabetes insipidus was made. For a diagnosis of diabetes insipidus during pregnancy, it is not recommended that a water deprivation test be performed, since it will cause dehydration and hemoconcentration, leading to uteroplacental insufficiency that may be dangerous to both mother and fetus[15]. However, dDAVP should be administered as early as possible when the condition is suggested, since it does not possess oxytocic or pressor activities, and will not lead to premature delivery[16]. Moreover, since dDAVP does not appear in breast milk or possess teratogenic activity[17]. it is safe to use during and after pregnancy[18]. A synthetic analogue of antidiuretic hormone (ADH), desmopressin is available in subcutaneous, IV, intranasal, and oral preparations[19]. Generally, it can be administered 2-3 times per day. Patients may require hospitalization to establish fluid needs. Frequent electrolyte monitoring is recommended during the initial phase of treatment. Desmopressin is a drug of choice for the long term management of central DI[20].

CONCLUSION;

Diabetes insipidus is a rare cause of urinary frequency during pregnancy. In our case with the clinical history, investigation results and response to Desmopression theray, a diagnosis of central diabetes insipidus was made. In patients with central DI, desmopressin is the drug of choice[8,9]. Polydipsia and polyuria in pregnancy should prompt a careful history taking and clinical evaluation for DI.

REFERENCES;

1. J. Lindholm, "Diabetes insipidus: historical aspects," Pituitary,vol.7, no.1, pp.33–38,2004.
2. J.G.Verbalis, "Diabetes insipidus," Reviews in Endocrine and Metabolic Disorders, vol.4, no.2, pp.177–185,2003.
3. M.Maghnie, G.Cosi, E.Genovese et al., "Central diabetes insipidus in children and young adults," The New England Journal of Medicine, vol.343, no.14,pp.998–1007,2000.
4. A.M.Moses, "Clinical and laboratory observations in the adult with diabetes insipidus and related syndromeseds," in Diabetes Insipidus in Man. Frontiers of Hormone Research, P. Czernichow and A.G. Robinson, Eds., vol.13, p.156, S Karger, Basel, Switzerland,1985.
5. Lacassie, et al.: Perioperative Anesthetic Management for Caesarian Section of a Parturient patient with Gestational DI. CanadianJournal of Anesthesiology,2005.
6. Gary L. Robertson Disorders of the Neurohypophysis , the 19th edition of Harrison's Principles of Internal Medicine. McGraw-Hill: New York 2015;2274-2283.
7. Baylis PH, Cheetham T:Diabetes insipidus.Arch Dis Child 1998;79:84–89.
8. Richardson DW, Robinson AG. Desmopressin.Ann Intern Med.1985Aug.103(2):228-39. [Medline].
9. Schrier RW. Systemic arterial vasodilation, vasopressin, and vasopressinase in pregnancy. J Am Soc Nephrol.2010Apr.21(4):570-2.[Medline].
10. Hensen J, Buchfelder M: The posterior pituitary and its disease; in Pinchera A, et al (eds): Endocrinology and Metabolism. New York, McGraw-Hill,2001,pp 99–115.
11. Dürr JA, Lindheimer MD. Diagnosis and management of diabetes insipidus during pregnancy. Endocr Pract.1996;2:353–361
12. Barbey, et al.:Case report: A Pregnant Woman with De Novo Polyuria-Polydipsia and Elevated Liver Enzymes. Nephrol Dial Transplant 2003.
13. American Diabetes Association Position Statement: Diabetes Care, Januar2004.

Volume : 6 | Issue : 5 | May 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 74.50

14. Hanson RS, Powrie RO, Larson L. Diabetes insipidus in pregnancy: a treatable cause of oligohydramnios. Obstet Gynecol 1997;89:816–7. Desmopressin. DDAVP (1-deamino-8-arginine vasopressin):
15. Krege J, Katz VL, Bowes WA Jr. Transient diabetes insipidus of pregnancy. Obstet Gynecol Surv.1989;44:789–795.
16. Robinson AG. DDAVP in the treatment of central diabetes insipidus. N Engl J Med. 1976;294:507–511.
17. Burrow GN, Wassenaar W, Robertson GL, Sehl H. DDAVP treatment of diabetes insipidus during pregnancy and the post-partum period. Acta Endocrinol. 1981;97:23–25.
18. Ray JG. DDAVP use during pregnancy: an analysis of its safety for mother and child. Obstet Gynecol Surv.1998;53:450–455.
19. Vande Walle J, Stockner M, Raes A, Nørgaard JP. Desmopressin 30 years in clinical use: a safety review. Curr Drug Saf.2007 Sep.2(3):232-8.[Medline].
20. K.S.L.Lam, M.S.Wat, K.L.Choi, T.P.Ip, R.W.C.Pang, and C.R.Kumana, "Pharmacokinetics, pharmacodynamics, long-term efficacy and safety of oral 1-deamino-8-D-arginine vasopressin in adult patients with central diabetes insipidus,"British Journal of Clinical Pharmacology, vol.42, no.3, pp.379–385,1996.