ORIGINAL RESEARCH PAPER

Volume-8 | Issue-3 | March-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

AN UNUSUAL PRESENTATION OF FAMILIAL NEPHROGENIC DIABETES INSIPIDUS

Paediatrics

Dr Karan Chopra From the Department of Pediatrics, Maulana Azad Medical College, New Delhi 110002.

Dr Ritika Garg From the Department of Pediatrics, Maulana Azad Medical College, New Delhi 110002.

Dr Divyanshi From the Department of Pediatrics, Maulana Azad Medical College, New Delhi 110002.

Dr Archana Kumari From the Department of Pediatrics, Maulana Azad Medical College, New Delhi 110002.

Dr Shalini Yadav From the Department of Pediatrics, Maulana Azad Medical College, New Delhi 110002.

Dr K.Rajeshwari* From the Department of Pediatrics, Maulana Azad Medical College, New Delhi 110002. *Corresponding Author

KEYWORDS

INTRODUCTION

Diabetes insipidus (DI) manifests clinically with polyuria and polydipsia and can result from either vasopressin deficiency (central DI) or vasopressin insensitivity at the level of the kidney (nephrogenic DI) . Both central DI and nephrogenic DI can arise from inherited defects of congenital or neonatal onset or can be secondary to a variety of causes(1).

We report an unusual presentation of familial nephrogenic DI in which all three female siblings of a family presented with features suggestive of nephrogenic DI.Written informed consent was obtained from the parents to publish this case .

CASE REPORT

A 7-year female a product of consanguinous marriage (3 rd degree) presented to our emergency department complaining of multiple episodes of non bilious vomiting for the past 4 days along with decreased oral intake and altered sensorium since 1 day. On further probing, parents revealed a history of polydipsia with polyuria and nocturia for the last 2 years along with poor appetite and poor weight gain ,for which no medical consultation was sought. There was no associated history of any head injury, contact with Tuberculosis or any recent surgery. The past history was insignificant and there was no history of seizures, altered behaviour, focal neurological deficits, or any features suggestive of cranial nerve involvement. At presentation ,the child was in altered sensorium with a GCS of E2 V4 M4 (10/15) , with a heart rate of 116/min, respiratory rate of 28/min, with cool peripheries and feeble peripheral pulses. Saturation was 97% on Room air and BP was unrecordable. Anthropometry revealed weight/age < 1st centile (severe wasting) and height /age at 3rd centile suggestive of stunting. Blood sugar done at admission was 160 mg/dl with urine for ketones and sugar being negative. Blood Gas analysis revealed a normal pH of 7.45 with a HCO3 of 16 mmol /L and a pCO2 of 24 mmHg. Serum electrolytes revealed a very high Serum Sodium of 204 meq /L with a Serum Potassium of 4.2 meql/L. Renal Function tests and Liver function tests were normal. Child was managed with normal saline boluses and started on hypernatremic dehydration correction and broad spectrum antibiotics (considering possibility of gram-negative sepsis). Fundus examination was normal with no evidence of papilledoema. In spite of fluid therapy serum sodium levels remained persistently high (>200mmol/l). In view of non-improvement, ionotropic and vasopressor support was provided to child.Urine output monitoring revealed polyuria with a urine output of 2.5 litres of urine in the initial 6 hours at 30ml/kg/ hr .Urine osmolality was below normal at 143 mosm/kg (normal range 300-900) with Urinary Sodium of 45 mmol/l and urinary potassium of 15.48 mmol/L. Polyuria with a dilute urine in a setting of severe hypernatremia(>200meq/L) raised a suspicion of Diabetes Insipidus.On further investigation, NCCT head was performed to look for any intracranial space occupying lesion ,which was normal.Child was started on Desmopressin oral tablets which did not show any improvement in the electrolyes . Further planned investigations included a desmopressin challenge test to differentiate between Central and nephrogenic DI .However ,despite the best efforts the child could not be saved and died within 20 hours of admission.

On detailed family history, the two other female siblings had similar complaints of polyuria and polydipsia. Each demonstrated wasting, short stature and anaemia. Urinary osmolarity(144 and 150 mmol/L respectively) was found to be low.MRI brain studies of both were normal. Desmopressin challenge test in both revealed no improvement in concentration of urine. A diagnosis of familial form of nephrogenic diabetes insipidus was made and they were started on thiazide diuretics.

On follow up visits both the siblings are doing well with adequate growth and normal serum electrolytes. Due to financial constraints, detailed genetic testing could not be done.

DISCUSSION

DI is a clinical syndrome characterized by polyuria (due to a defect in the urinary concentrating mechanism) and compensatory polydipsia. In the general population, the prevalence of DI is approximately one per 25,000–30,000 2. Upon restricted/inadequate water intake to compensate for the urinary loss of water, these patients are at risk of becoming severely dehydrated. There are four fundamental types of DI namely central, nephrogenic ,gestational and primary polydipsia3.

Congenital Nephrogenic DI is caused by mutations in the AVPR2 or the AQP2 gene.The distal nephron is in these cases insensitive to AVP resulting in blunted water reabsorption in the collecting ducts. The urine concentrating defect is present from birth, and symptoms arise during the first weeks of life. Infants often suffer from hypernatremic dehydration, with symptoms of irritability, poor feeding, and weight gain . In so-called partial forms of NDI , patients retain some ability to concentrate urine, lowering their risk of developing severe dehydration. Left untreated, most patients fail to grow normally, but with initiation of treatment, most recover their initial weight loss .In periods of stress, when the adequate hydration is not present , these children can present with severe hypernatremia as seen in the index case. Mental retardation, assumed to result from repeated episodes of brain dehydration and brain edema (brought about by attempts to rehydrate too quickly) can be a serious complication of NDI . The persistent polyuria can cause development of megacystis, trabeculated bladder, hydroureter, and hydronephrosis

Congenital NDI can be either X linked ,atosomosal recessive or autosomal dominant . X-linked NDI (XLNDI) accounts for 90% of cases while autosomal recessive NDI accounts for the other 10%. In most cases (90%), inherited NDI is an X-linked condition caused by a loss-of-function mutation in the V2R gene. It is rarely due to mutations in the AQP2 gene (10%)4.

Various drugs used for management of NDI include Carbamazepine, clofibrate,chlorpropamide,thiazide , indapamide,indomethacin and amiloride.Best results have been obtained with thiazide and amiloride

combinations.

REFERENCES

1. Nelson Textbook of Pediatrics 20th edition
2. Heinke F, Labudde D. 2012 Membrane protein stability analyses by means of protein energy profiles in case of nephrogenic diabetes insipidus. Comput Math Methods Medn.2012: 790281 Hanne B. Moeller Søren Rittig Robert A. Fenton
3. Endocrine Reviews, Volume 34, Issue 2, 1 April 2013, Pages 278–301
4. García Castaño A, Pérez de Nanclares G, Madariaga L, Aguirre M, Chocron S, Madrid A, et al. Novel mutations associated with nephrogenic diabetes insipidus. A clinical-genetic study. Eur J Pediatr. 2015;174:1373–85. Sanjay Kalra
5. , Abdul Hamid Zargar et al.Indian J Endocrinol Metab. 2016 Jan-Feb; 20(1): 9–21