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**Case Report**

# Eight year old male with autism spectrum disorder and associated hematuria and nephrolithiasis

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## ABSTRACT

This is the case of an 8-year-old male of Egyptian descent, with Autism Spectrum Disorder and associated hematuria and nephrolithiasis. A few relevant case reports of children with autism and comorbid nephrolithiasis have been reported. His case is being reported to draw attention to this particular comorbidity, which may cause other clinicians to report similar cases, and generate an interest in further exploring the renal comorbidities/metabolic correlates of autism.

**Keywords:** Autism, Hematuria, Nephrolithiasis

## INTRODUCTION

Autism Spectrum Disorder is a neurodevelopmental disorder characterized by social/emotional, communication and behavioural deficits with no known cause. Some newer theories propose metabolic deficiencies. Nephrolithiasis is not a known correlate of autism. It is a relatively rare affliction for children in developed nations; however it is endemic in developing countries due to diet, environment and infection.[1] We present this case to draw attention to the possible links between specific renal metabolic abnormalities and autism.

## CASE REPORT

The child is an 8-year-old boy of Egyptian descent who was diagnosed with Autism Spectrum Disorder at 5 years of age.

He was born at term by cesarean section because of breech presentation. Birth weight was 6 pounds 14 ounces. There were no problems in the nursery. Medical problems became evident shortly after birth, initially feeding difficulties and vomiting, then hematuria, hypercalcemia and renal stones at 8 months of age.

Kidney stones were again noted at 2 years of age. He was seen by a nephrologist and an endocrinologist, to rule out calcium metabolism abnormalities. Except for a low bicarbonate level, which could be explained by poor specimen handling, no specific metabolic abnormalities were found. The extensive workup included renal ultrasounds, parathyroid hormone levels, vitamin D levels, serum calcium levels, urine calcium levels, urine levels of citric acid, uric acid, isocitric acid, oxoglutaric acid, and 5-HIAA, all of which were normal.

Plasma amino acid analysis was essentially normal, urine organic acid screen showed some elevation of acetoacetate indicative of ketosis but was otherwise normal. CK and CK isoenzymes were normal. Leukocyte cystine assay was normal. Chromosomal karyotyping showed a normal male 46,XY. FISH for Williams syndrome was normal. There was no specific diagnosis that could be made following genetic and metabolic evaluations.

The last blood tests at age 8 years 8 months showed a cholesterol level of 149.

He walked independently by 14 months of age with no toe walking. He was toilet trained by 3 years of age. At 4 ½ years of age, he was able to hold a crayon and scribble with it, and was able to feed himself and get undressed and dressed, with help. His first word was at 9 months of age, he had a vocabulary of 7 to 8 words at 15 to 16 months. He developed a vocabulary of 50 words at age 3 years, began to put two words together at age 3 ½ years, and began to speak in short sentences at age 4 years. Despite the ability to speak in phrases and sentences he did not have effective social communication skills. He could not process verbal questions or instructions adequately and many of his responses were irrelevant or tangential. He was not able to engage with people socially for any sustained length of time.

He had no history of motor or vocal tics, but had hand stimming.

Around age 2 years, he had two episodes of sudden-onset scared appearance, upper extremity jerking and screaming. EEG showed mild slowing in the right frontal and temporal regions, but no epileptiform activity. Repeat EEG and 24-hour ambulatory EEG were normal. MRI of the brain without contrast was normal.

His hearing and vision tests were within normal limits. He did not have enough tearing but was not considered to have a dry eye syndrome. He had no cardiac symptoms and had a normal echocardiogram. During infancy, he was diagnosed with gastroesophageal reflux. Later, he was diagnosed to have a poor appetite, weight loss, failure to thrive and constipation. Appetite and physical growth improved subsequently. His sleep was characterized by occasional awakenings, snoring, sleepwalking and sleep-talking. He had a history of recurrent respiratory infections and had an immunological work up, with no abnormalities found.

Autism Spectrum Disorder was diagnosed at 5 years of age, based on DSM-IV TR diagnostic criteria.

Family and genetic history is significant for consanguinity, with Mom and Dad being second cousins, both from Egypt. Mom had a brother who passed away at age 26 years, who reportedly had some type of a neurological problem essentially since birth, which manifested as mental retardation of a severe degree along with seizures. Mom herself has a history of hypercalcemia and a diagnosis of Rheumatoid Arthritis. Dad has a history of hypercholesterolemia. He also was diagnosed with papillary thyroid cancer and pulmonary embolism with no history of parathyroid problems.

## DISCUSSION

Current literature is sparse on the topic of autism and metabolic disorders but some interesting associations have been found. For example, it is well known that Phenylketonuria and Histidinemia can cause Autism. Whenever such syndromes have been identified and dietary supplementation or modifications have been instituted, there has been decreased symptom severity or even prevention if measures are put in place early on. There are other anecdotal examples of metabolic interventions, such as implementation of a ketogenic diet and high vitamin D supplementation, which can ameliorate the symptoms of autism.[2,3]

Additional evidence for metabolic abnormalities in autism has been found. Children with autism have been demonstrated to have up to three-fold higher oxalate levels in the blood, which leads to iron offloading in vitro.[4] Some evidence suggests that iron deficiency may be more common in people with Autism.[5] In one study, approximately 20% of the autistic population was shown to have some level of hyperuricosuria suggesting the possibility of a purine metabolism defect.[6]

As far as an association of renal metabolic defects in autism, three relevant case reports have been published. In one, an autistic child with Hereditary Xanthinuria type II, with high xanthine and hypoxanthine levels, presents with kidney stones despite low uric acid in blood and urine.[7] In the second, an autistic child was reported to have development of kidney stones in response to vitamin A treatment. This is a rare side effect from vitamin A overdose with only 11 reported cases since 1953.[8] A third relevant case reports vitamin A overdose in a young autistic boy causing hypercalcemia without leading to kidney stones.[9] This combined information suggests a possible low threshold for nephrolithiasis formation in children with autism, or perhaps in some subset, especially in view of the fact that the diet of children with autism tends to be limited for various reasons including sensory and gastrointestinal issues.

We therefore present this case as an addition to the previously reported cases of autism with coexisting renal metabolic abnormalities. Our patient has no known cause for his nephrolithiasis, despite significant work-up. It is possible that a subclinical metabolic deficiency not yet known to be associated with autism has increased his susceptibility to kidney stones. His Egyptian influenced diet, one that may be linked to the high rate of nephrolithiasis in Egyptian children, may have contributed to the manifestation of these symptoms and could have revealed an otherwise subclinical attribute of autism.[1] It is our hope that reporting this case will direct attention and research to potential renal comorbidities/metabolic correlates of autism.

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## REFERENCES

1. Aggour A, Ziada A, Abdel Hamid A, AbdelRahman S, Morsi A. Metabolic Stone Composition in Egyptian Children. J Pediatr Urol. 2008;5:132-5.
2. Napoli E, Dueñas N, Giulivi C. Potential therapeutic use of the ketogenic diet in autism spectrum disorders. Front Pediatr. 2014;2:69.
3. Jia F, Wang B, Shan L, Xu Z, Staal W, Du L. Core Symptoms of Autism Improved after Vitamin D Supplementation. Pediatrics. 2015;135:e196-8.
4. Luck A, Bobst C, Kaltashov I, Mason A. Human serum transferrin: Is there a link between Autism, high oxalate and iron deficiency anemia? Biochemistry. 2013;52:46.
5. Reynolds A, Krebs N, Stewart P, Austin H, Johnson S, Withrow N, et al. Iron Status in Children with Autism Spectrum Disorder. Pediatrics. 2012;130:S154-9.
6. Page T, Coleman M. Purine Metabolism abnormalities in a hyperuricosuria subclass of Autism. Bichim Biophys Acta. 2000;1500:291-6.
7. Zannoli R, Micheli V, Mazzei M, Sacco P, Piomboni P, Bruni E, et al. Hereditary xanthinuria type II associated with mental delay, autism, cortical renal cysts, nephrocalcinosis, osteopenia, and hair and teeth defects. J Med Genet. 2003;40:121.
8. Vyas A, White N. Case of Hypercalcemia Secondary to Hypervitaminosis A in a 6-Year-Old Boy with Autism. Case Rep Endocrinol 2011; Article ID 424712.
9. Kimmoun A, Leheup B, Feillet F, Dubois F, Morali A. Hypercalcemia revealing iatrogenic hypervitaminosis A in a child with autistic troubles. Arch Pediatr. 2008;15:1:29-32.

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