A Rare Case of Pseudohyponatremia in an Elderly Male with Pancreatic Adenocarcinoma – Laboratory artifact or Idiopathic?

Mohammed Gandam, MD[1]; Aquila Fathima, MD[1]; Aashritha Ramesh, MD[1]; Mahshid Mir, MD[1]; Santhoshi Bavi MD[1]; Alan Auerbach, MD[1]; Sujatha Kailas, MD[1]; George Atia, MD[1]; Shyam Chalise, MD[1]

[1]Ascension Saint Joseph Hospital, Chicago, IL

Ascension Saint Joseph

Take Home Points

- Obstructive jaundice has rarely known to cause pseudohyponatremia
- Patients with obstructive jaundice if present with asymptomatic hyponatremia especially in the setting of euvolemia which cannot be explained by other etiologies should be evaluated further.
- Measuring low density lipoproteins and serum lipids can establish pseudohyponatremia in these patients
- However, if these levels are normal, watchful waiting and close monitoring after relief of obstruction should be exercised which may spontaneously improve hyponatremia.
- Delay in relieving obstruction may worsen disease course and overall outcomes.

CONTACT

Mohammed Gandam, MD
Ascension Saint Joseph Hospital
drmdraasiq@gmail.com
Website:
18478a5a?lipi=urn%3Ali%3Apage%3Ad_flagship3_profile_view_base_contact_details%3BTkUv9rafSZGHskvKhk60dQ%3D%3D

INTRODUCTION

- Electrolyte imbalance in patients with obstructive jaundice is rare.
- Case reports of pseudohyponatremia in patients with obstructive jaundice have been previously described by Sivakumar et. al and Adashek et. al.
- They described the artifactual hyponatremia in the setting of hyperlipidemia and hyper lipoproteinemia.
- We describe a case of pseudohyponatremia with obstructive jaundice with modest elevation in total cholesterol and LDL

Case Description

- A 73-year-old Asian male patient with a history of type 2 diabetes mellitus presented with a 4-week history of generalized malaise, 2- week history of yellowish discoloration of both eyes, nightly upper abdominal pain, nausea and one episode of vomiting. He also reported a 10 kg weight loss in the last 6 weeks.
- He was noted to have hyponatremia and elevated liver enzymes by his primary doctor and was sent to the ER for evaluation.
- His serum sodium on admission was 117. Sodium corrected to hyperglycemia was 122. Measured serum osmolality was 261 and calculated was 275.
- He was treated with NS 1L over 10 hours and AM lipid panel was obtained (Table 2). A CT of the abdomen and pelvis showed a distended gallbladder with dilatation of the intrahepatic and common biliary ducts with the CBD measuring up to 11 mm near the head of the pancreas.
- The serum sodium did not improve after IV fluid administration which were eventually stopped as he appeared to be clinically euvolemic. An ERCP revealed a 2 cm biliary/pancreatic stricture compatible with pancreatic cancer and a 7 F stent was placed. CA 19-9 was noted to be 149.6.
- His serum sodium improved spontaneously without intervention. At discharge, his corrected serum sodium improved to 132.
- A EUS guided biopsy confirmed pancreatic adenocarcinoma.

Table 1. Chem Profile trends

Chem profile	Ref. Range	5/18/22 8:53	5/24/22 12:25	5/25/22 4:05	5/25/22 18:33	5/26/22 0:58	5/26/22 6:55	5/26/22 17:18	5/27/22 6:06	6/2/22 8:10
Total Protein	6.4 - 8.9 g/dL	7.7	6.6	6			6.8		6.8	7.2
Glucose	70 - 99 mg/dL	268	411	162	232	265	217	246	193	149
BUN	7 - 25 mg/dL	18	13	8	8	8	8	7	5	18
CREATININE	0.6 - 1.3 mg/dL	1.02	0.96	0.88	0.86	0.87	0.86	0.68	0.7	0.85
Sodium	133 - 144 mmol/L	124	117	119	118	119	121	121	125	128
Potassium	3.5 - 5.2 mmol/L	4.8	4.2	3.7	4.1	3.9	3.4	4.4	3.9	4.5
Chloride	98 - 107 mmol/L	88	81	87	86	89	89	91	92	93
CO2	21 - 31 mmol/L	27	23	25	20	23	23	21	24	27
Anion Gap	6 - 14 mmol/L	9	13	7	12	7	9	9	9	8
BUN/Creatinine Ratio	6.0 - 20.0	17.6	13.5	9.1	9.3	9.2	9.3	10.3	7.1	21.2
Calcium	8.6 - 10.3 mg/dL	9.7	9.1	8.6	8.7	8.4	8.6	8.4	8.7	9.3
Phosphorus	2.5 - 4.5 mg/dL						2.6			
Albumin	3.5 - 5.7 g/dL	4.2	3.8	3.4			3.7		3.8	3.8
AST	13 - 39 IU/L	150	168	167			88		73	104
ALT	7 - 52 IU/L	614	448	401			346		273	385
Alkaline Phosphatase	40 - 129 IU/L	363	589	480			514		424	524
Total Bilirubin	0.0 - 1.0 mg/dL	15.8	27.2	25.4			14.9		10.5	5.7

Table 2. Lipid Profile

Lipid profile	Ref. Range	5/24/22 12:25
Cholesterol	Latest Ref Range: 0 - 200 mg/dL	349
Triglycerides	Latest Ref Range: 0 - 150 mg/dL	180
HDL	Latest Ref Range: 35 - 55 mg/dL	13
Non-HDL Cholesterol	Latest Units: mg/dL	336
Chol/HDL Ratio	Latest Ref Range: 2.00 - 5.50	26.8
VLDL	Latest Ref Range: 2.0 - 50.0 mg/dL	36
LDL Calculated	Latest Ref Range: <130 mg/dL	300

DISCUSSION

- Unmeasured proteins and/or lipids may be seen in intra-and extra hepatic cholestasis which can falsely result in a low serum sodium. These have been reported in a few case reports which demonstrated the laboratory abnormality accounting for unmeasured serum lipids and/or proteins.
- These spurious anomalies may impede diagnosis and initial management and may worsen the clinical course.
- However, our case demonstrates pseudohyponatremia in the absence of these laboratory abnormalities.
- It is unknown as to why and how obstructive jaundice contributes to pseudohyponatremia.
- A high degree of caution should be exercised when met with conflicting clinical and laboratory abnormalities.
- Clinicians may exercise inappropriate choice of fluids especially when met with those suffering from pancreatitis.
- This may further lead to complications of rapid correction of sodium and hypernatremia.
- A high clinical suspicion should be exercised when met with severe asymptomatic hyponatremia. Sodium should be monitored after relieving the obstruction for spontaneous improvement if not underlying secondary cause is identified.
- We suggest evaluating for unmeasured lipids and protein to explain the pseudohyponatremia. If these are normal, watchful waiting after relieving the obstruction should be exercised.
- Further studies are required to evaluate the causality of pseudohyponatremia in patients with obstructive jaundice.

REFERENCES

1. Igbinedion, S.O., et al., *Pseudohyponatraemia secondary to hyperlipidaemia in obstructive jaundice.* BMJ Case Rep, 2017. **2017**.
2. Adashek, M.L., et al., *The Hyperlipidemia Effect: Pseudohyponatremia in Pancreatic Cancer.* Am J Med, 2017. **130**(12): p. 1372-1375.
3. Ravella, S., et al., *Hyponatremia in a patient with obstructive jaundice.* Kidney Int, 2015. **88**(4): p. 921-2.
4. Cangemi, D.J., S.T. Donovan, and M.M. Johnson, *62-year-old man with painless jaundice and hyponatremia.* Mayo Clin Proc, 2013. **88**(6): p. e49-53.
5. Sivakumar, T., et al., *Multiple lipoprotein and electrolyte laboratory artifacts caused by lipoprotein X in obstructive biliary cholestasis secondary to pancreatic cancer.* J Clin Lipidol, 2011. **5**(4): p. 324-8.
6. le Riche, M., L.J. Burgess, and A.D. Marais, *Pseudohyponatraemia in a patient with obstructive jaundice.* Clin Chim Acta, 2006. **366**(1-2): p. 357-60.