

Seizures due to hyponatremia following polyethylene glycol preparation; a report of two cases

Colonoscopic screening and adenoma removal have been reported to reduce deaths from colorectal cancer [1,2]. Proper bowel preparation is needed for adequate visualization of the colonic mucosa [3]. Issues concerning the safety of oral sodium phosphate have been raised, so guidelines recommend the use of polyethylene glycol (PEG) [3,4]. It has been reported that using PEG for bowel cleansing prior to colonoscopy does not cause any electrolyte disturbances [5]. However, there have also been reports of serious adverse events related to PEG use [4,6].

We report here on two women who were admitted with generalized tonic-clonic seizures induced by precolonoscopic PEG preparation. Their pertinent clinical and laboratory data are shown under patients #1 and #2 in **Table 1**. They were treated with intravenous sodium solutions; as their sodium levels recovered, they both showed complete neurologic recovery. Follow-up visits showed normal sodium levels without neurologic deficits.

Along with the characteristics of our patients, the clinical findings of the previously reported cases of hyponatremia

due to PEG are also shown in **Table 1**. All of the patients were aged over 50, with four being over 60. Patient #3 had pre-existing end-stage renal disease and patient #4 was taking thiazide diuretics, which would have impaired her ability to excrete water [7]. Patient #5 was similar to patient #1 in that she showed normal renal, thyroid, and adrenal function, but had ingested 4L of fluids in addition to the 3L of PEG [8]. Nonosmolar antidiuretic hormone stimulation combined with old age and a large volume of fluid most likely caused her hyponatremia. The final patient had been taking serotonin reuptake inhibitors, had inadequate thyroid replacement, and was aged over 70, which would have further aggravated her hyponatremia [9].

Our two patients developed hyponatremia even with the relatively safe laxative

Table 1 A summary of the clinical findings in our two patients (#1 and #2) and other patients reported in the literature with polyethylene glycol (PEG)-related hyponatremia.

Patient number	1	2	3 [7]	4 [7]	5 [8]	6 [9]
Age	70	65	51	62	59	73
Sex	Female	Female	Male	Female	Female	Female
Past history/ underlying disease	Hypertension, osteoporosis, mild stenosis of internal carotid artery	Breast cancer, total thyroidec- tomy and radio- iodine therapy	Diabetes, end- stage renal failure	Hypertension, hyperlipidemia	Hysterectomy with oophorectomy	Hypothyroidism, depression
Prescription drugs	Amlodipine, ibandronic acid, clopidogrel	Levothyroxine	Amlodipine, aten- olol, furosemide, calcium acetate, omeprazole	Thiazide	Estradiol, aspirin	Levothyroxine, citalopram
Preparation methods	4 L PEG and 3 L clear water	4 L PEG	N/A	4 L PEG	3 L PEG and 4 L weak tea	255 g PEG and 64 ounces Gatorade
Clinical presentation	Seizure	Seizure	Emesis, idioven- tricular rhythm, cardiac arrest	Seizure	Confusion	Seizure
Blood pressure, mmHg	190/100	156/85	167/78	130/90	110/70	Within normal range
Pulse, beats per min	84	86	103	90	60	Within normal range
Sodium, mmol/L						
Baseline	140	144	138	138	N/A	N/A
Lowest	110	127	122	116	120	117
Post-treatment	138	141	N/A	130	138	131
Potassium, mmol/L	3.4	4.3	5.1	3.9	4.6	3.3
Chloride, mmol/L	72	104	94	79	N/A	79
Bicarbonate, mmol/L	17.3	17.3	20	26	17.2	21
Urea, mg/dL	11.8	14.6	24.3	2.5	N/A	6
Creatinine, mg/dL	0.67	0.71	7.7	0.6	0.9	0.6
Glucose, mg/dL	148	235	95.5	N/A	93	N/A
Brain CT/MRI findings	No abnormalities	No abnormalities	Not done	Cerebral edema	No abnormalities	Not done
Treatment	IV 3% saline	IV normal saline	None	IV 3% saline	IV normal saline	IV 2% saline, then NaCl tablets & water restriction
Outcome	Complete recovery	Complete recovery	Death	Complete recovery	Complete recovery	Complete recovery

N/A, not available; IV, intravenous; NaCl, sodium chloride.

PEG, which raises safety issues that should be carefully considered when instituting colonoscopic procedures.

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