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

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

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

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Competing interests: None

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References


Bibliography

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