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CASE REPORT

Cerebral Edema Associated with Hyponatremia After Hysteroscopic Myomectomy

Histeroskopik Miyomektomi Sonrası Gelişen Hiponatremi ile İlişkili Serebral Ödem

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Abstract

The hypotonic fluid used for distention of the uterus during hysteroscopic myomectomy creates hyponatremia and hypervolemia with resulting cerebral edema. This situation is called operative hysteroscopy ıntravascular absorption syndrome. A 33-year-old woman was admitted for elective hysteroscopic myomectomy with general anesthesia. Sorbitol/mannitol solution was used as a distending solution for surgical hysteroscopy. The patient did not wake up after the operation and generalized seizures had been started. Hyponatremia was detected in her blood tests and started to be corrected rapidly with hypertonic saline. Brain edema was considered in her cranial magnetic resonance imaging. The patient was completely recovered after the treatment. This case is the case of brain edema caused by hyponatremia occurring after hysteroscopic surgery. It was presented with rarely reported symptoms such as seizures and psychosis, which resulted in a good prognosis. A case of acute cerebral edema progressing in this way has been rarely reported in the literature.

Keywords: Cerebral edema; Hyponatremia; Hysteroscopic myomectomy

Operative hysteroscopy is a safe surgical procedure for the uterus. One of the most feared complications is severe hemodilution by the absorption of the distension medium.[1] Hypotonic, low-viscosity fluids such as 5% mannitol, 3% sorbitol, and 1.5% glycine can be used during operation. These low viscosity fluids risk rapid fluid absorption, resulting in fluid overload and electrolyte imbalance.[2] Attendant toxicity syndrome is called operative hysteroscopy ıntravascular absorption (OHIA) syndrome.[3] The first symptoms of electrolytic imbalance are nausea and vomiting, visual disturbances, and altered states of consciousness. But hysteroscopic surgery is often performed with general anesthesia, and early symptoms are overlooked. Excessive fluid uptake presents pulmonary edema, cardiovascular collapse, seizure, brain edema, and encephalopathy due to acute hyponatremia. These side effects can also lead to death.[1,4]

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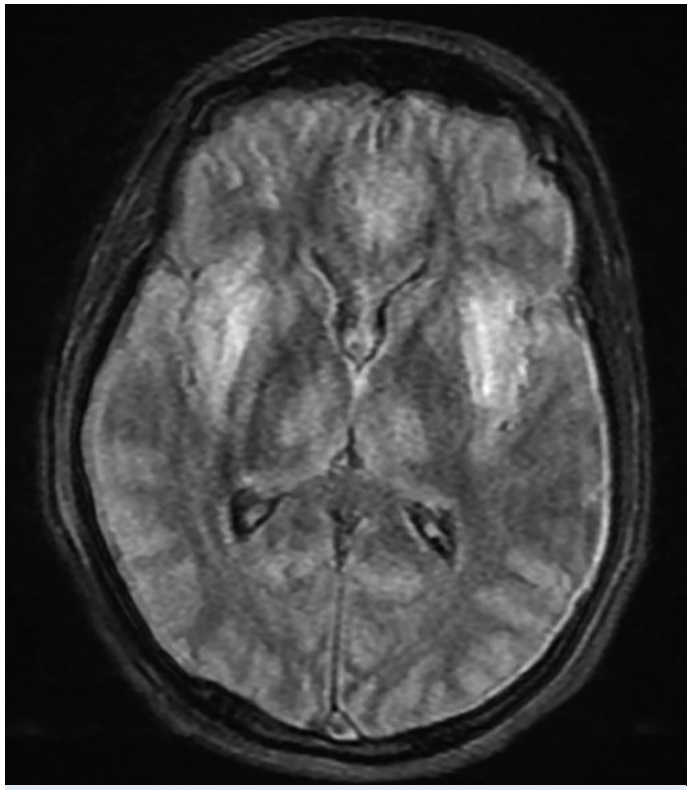

Figure 1. Cerebral edema in initial T2 FLAIR MRI.

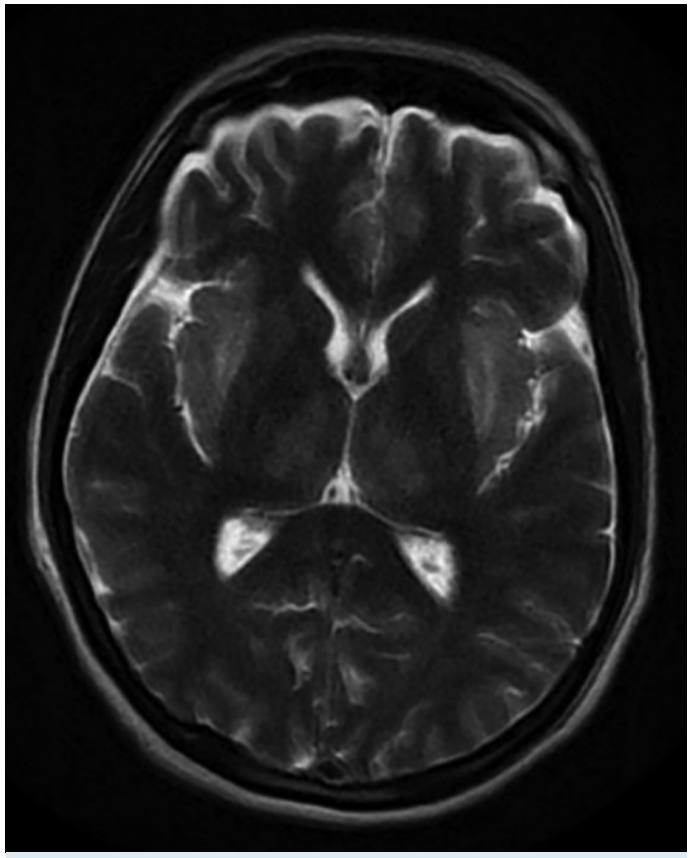

Figure 2. Cerebral edema in initial T2 MRI.

This case is the case of brain edema caused by hyponatremia after hysteroscopic surgery. It is presented with rarely reported symptoms such as seizures and psychosis, resulting in a good prognosis. A case of acute brain edema progressing in this way has been rarely reported in the literature. An informed consent form was obtained from the patient.

Case Report

A 33-year-old woman with menorrhagia was admitted for elective hysteroscopic myomectomy with general anesthesia. Sorbitol/mannitol solution was used as a distending solution for surgical hysteroscopy. There was no previous history or family history of psychiatric illness, and she did not use any medication. Preoperative blood tests, which included electrolyte analyses, a full blood exam, and coagulation parameters showed no anomalies. Vital parameters were stable before and after anesthesia. In the blood tests and arterial blood gas tests sent upon the patient's awakening after the operation, she had generalized tonic-clonic seizures several times. The first arterial blood gas results were PH 7.24, PaO_2 520 mmHg, $PaCO_2$ 31.8 mmHg, base excess -12.7 mmol/L, SaO_2 100%. Na value was 104 mmol/L (135–145 mmol/L) and started to be corrected rapidly with hypertonic saline. Other mild electrolyte abnormalities included serum chloride level of 71 mmol/L (96–108 mmol/L), serum bicarbonate level of 14.7 mmol/L (22–32 mmol/L), and serum calcium level of 0.58 mmol/L (1.12–1.30 mmol/L). Chest radiograph showed no pathology. The control Na value, which was sent 1 h later, reached 119 mmol/L. Upon the continuation of the seizure, she was transferred to our hospital. In the neurological examination performed at the patient's arrival, she was intubated and connected mechanical ventilator, unconscious, pupillary bilateral myotic, and no apparent response with painful stimulus. No pathological reflex was detected. In the cranial magnetic resonance examination, mild brain edema was considered in the bilateral insular cortex, at the level of the capsula externa, bilateral thalamus, and pons, and ventricular compression (Fig. 1, 2). The patient who had seizures again was given intravenous phenytoin loading, and steroid and supportive treatment were started. Widespread generalized slow waves were recorded in electroencephalogram (EEG) (Fig. 3). The patient left the mechanical ventilator after consciousness. Crying attacks, agitated delirium, and psychotic symptoms developed during the follow-up. Then, she was treated using haloperidol, and these symptoms decreased. In the control cranial magnetic resonance imaging (MRI), cerebral edema was completely cured (Fig.

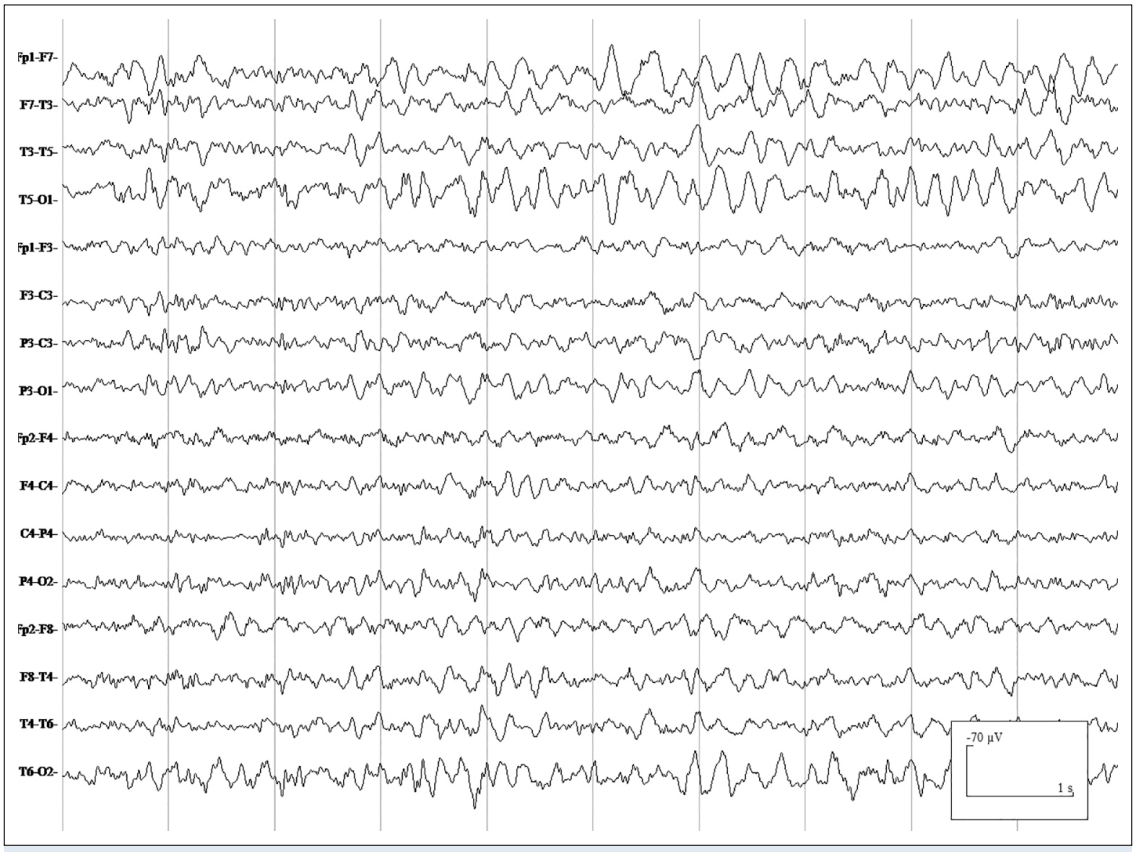

Figure 3. Generalized slow waves in EEG.

4). EEG was normal in the patient who was discharged without any sequela (Fig. 5). Gradually, phenytoin and haloperidol treatment was discontinued in the controls.

Discussion

Hysteroscopic procedures have been increasingly used. The frequency of complications of hysteroscopic surgery is reported to be as low as 0.24%, but may go up to 10% with more complicated surgeries such as hysteroscopic myomectomy.[1,5] Hypotonic, low-viscosity fluids such as 5% mannitol, 3% sorbitol, and 1.5% glycine can be used during operation. Liquid distension media such as 1.5% glycine are used for optimal visualization during hysteroscopy. The uterine wall is thick and requires high distending pressures. These low viscosity fluids risk rapid fluid absorption, resulting in fluid overload and electrolyte imbalance and cause attendant toxicity syndrome called OHIA.[2,3] OHIA syndrome manifestations may include nausea, vomiting, headache, weakness, pulmonary edema, acute respiratory distress syndrome, laryngeal edema, cerebral edema, hyponatremia, hypocalcemia, diffuse intravascular coagulation, and rhabdomyolysis. The classic syndrome itself is rare (<%1 incidence); however, it can be life-threatening.[3,6,7]

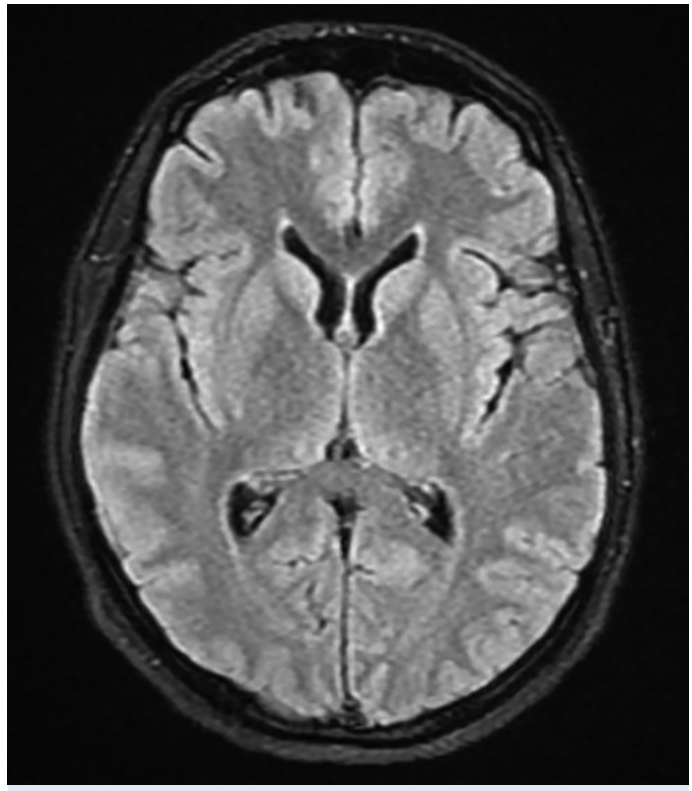

Figure 4. No lesions in the control cranial MRI.

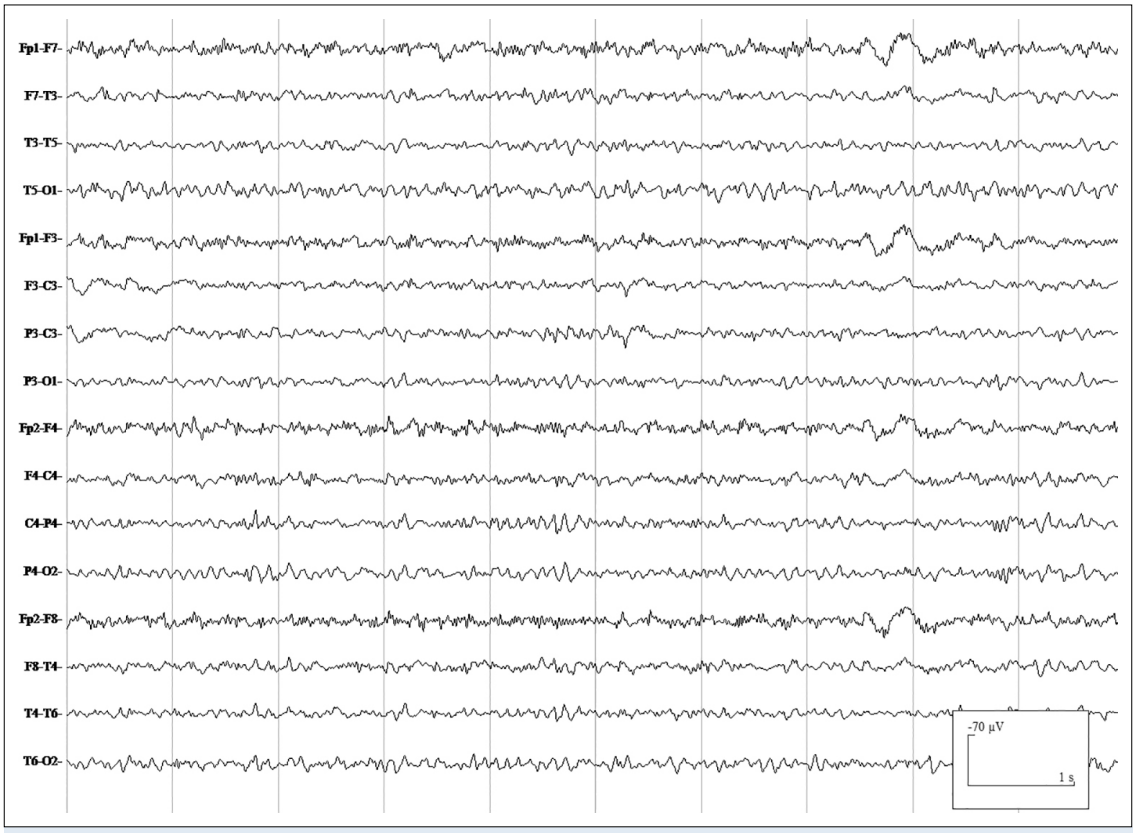

Figure 5. Normal EEG findings in control.

Commonly, the absorption of fluid distension media can cause unpredictable complications such as volume overload, dilutional hyponatremia, water intoxication, and cerebral edema. General anesthesia could mask early signs of hyponatremia and water intoxication such as bradycardia, hypertension, headache, nausea, and mental status change.[2,8] In our patient, who had general anesthesia, we did not detect water intoxication and hyponatremia until cerebral edema developed, which presented with seizures. Hyponatremia is associated with convulsions and coma. These signs are mainly caused by acute serum hypoosmolality. Sometimes, hyponatremia can lead to permanent and lethal complications.[2]

Treatment of this syndrome should begin early. In addition to supportive measures, symptomatic and/or severe acute hyponatremia (serum sodium <120 mmol/L) may be treated with 3% hypertonic saline as a 100-mL bolus infused over 10 min. This may be repeated up to three times as needed to increase the serum sodium by 4–6 mmol/L to prevent herniation. Patients with less severe presentations may be treated with a slow infusion of 3% hypertonic saline (0.5–2 mL/kg/h).[3,9] Alternatively, these patients may be treated with 0.9% saline and loop diuretics. Monitoring of electrolytes every 2–4 h is also recommended.

Prevention of fluid overload is of prime importance. The fluid balance should be calculated at least every 10 min. While manual closed systems of fluid balance may not always be practical or precise, the newer automated fluid management systems may prove to be more accurate, especially for advanced resections such as myomectomy, and 5% mannitol is probably safer than other distending media. Using regional anesthesia may be useful for the early detection of symptoms in an awake patient.[10]

In our case, the patient experienced extreme hyponatremia (114 mmol/L) accompanied by metabolic acidosis due to absorption of the distention medium, resulting in seizures and brain edema. Serum sodium level was rapidly corrected with only 3% saline, and 1 h later, serum sodium was increased 15 mmol/L. The patient's mental status was fully recovered. MRI findings were completely normal after 1 month, and neurological disability was much improved. This case was presented with rarely reported symptoms such as seizures and psychosis, resulting in a good prognosis.

In conclusion, this case shows the risk of extreme hyponatremia caused by distension medium absorption during hysteroscopy. Early detection and prompt management are important for patient recovery without neurologic complications.

Peer-review: Externally peer-reviewed.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Authorship Contributions: Concept: EE; Design: EE; Supervision: EE, Cİ; Materials: EE, KA; Data Collection or Processing: EE; Analysis or Interpretation: EE; Literature Search: EE, Cİ; Writing: EE, Cİ; Critical Review: EE, KA.

Conflict of Interest: None declared.

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