Case report

Acute subdural haematoma accompanied by anorexia nervosa

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Accepted 11 September 2019

SUMMARY

We report the case of a patient with anorexia nervosa accompanied by acute subdural haematoma following a fall. A 34-year-old Japanese woman had serious medical complications and brain atrophy. After careful nutritional treatment, her laboratory test results improved and brain atrophy was reversed, and we prevented to perform surgery. However, unexpected prominent oedema of her lower legs and pleural effusion occurred. After receiving treatment for these symptoms, she eventually returned to her former occupation and started following a normal diet. Very few cases of anorexia nervosa accompanied by intracranial haemorrhage have been reported. Coagulation disorder and brain atrophy are supposed to be the primary causes of haematoma formation in the present case. Intracranial haemorrhage likely occurs in patients with anorexia nervosa despite minor head trauma. Because anorexia nervosa is not rare and the age of such patients is advancing, knowledge regarding this disorder would be useful for neurosurgeons.

BACKGROUND

Anorexia nervosa is an eating disorder that primarily affects women¹ and is associated with serious medical complications.^{2 3} Very few studies regarding intracranial haemorrhage in patients with anorexia nervosa have been reported.⁴ Here, we report a case of acute subdural haematoma accompanied by anorexia nervosa. We successfully treated the patient conservatively despite unexpected complications. Neurosurgeons should be aware of the specific features of medical complications in patients with anorexia nervosa.

CASE PRESENTATION

A 34-year-old Japanese woman experienced nausea and visited our hospital after she fell down during walking. Her head suffered blunt injury and she did not experience loss of consciousness. On admission, her neurological examination findings were normal with a Glasgow Coma Scale score of 15. She was severely emaciated. Her height was 157 cm and bodyweight was 24 kg (body mass index, 9.7 kg/m²). Her vital signs were as follows: arterial pressure, 74/44 mm Hg; heart rate, 54 bpm and body temperature, 34.4°C. She had a history of anorexia nervosa for approximately 20 years. She had temporarily visited a psychiatry clinic, but had been untreated for a long period. The quantity of meals consumed per day by her was less than a rice ball or a slice of bread at the time she

visited our hospital because her masticatory muscle strength had severely decreased. Furthermore, she had amenorrhea. Laboratory test findings revealed liver dysfunction, renal dysfunction, dehydration, electrolyte disorder, anaemia and decreased platelet count (table 1). CT at the admission showed brain atrophy and bilateral acute subdural haematoma, predominantly on the left side (figure 1).

TREATMENT

Considering her neurological and radiological findings, we decided to administer nutritional treatment for improving her life-threatening status and medical complications. At admission, we prescribed parenteral fluid administration (1000 mL/day) containing vitamins and restricted her oral calorie intake, preventing fatal refeeding syndrome. We confirmed no haematoma enlargement at 2 hours and on the following day of admission. Her laboratory test results indicated recovery due to trans-oral and parenteral nutrition; furthermore, her brain atrophy reversed and the subdural haematoma disappeared (table 1, figure 2). Her body weight increased by 6 kg within 10 days; however, prominent oedema developed in her lower legs, and she could not stand without assistance due to the relatively heavy weight on her weakened muscles. Thoracic CT also showed increased pleural effusion (figure 3). Echocardiogram showed preserved left ventricular ejection fraction. We prescribed a diuretic drug (10 mg furosemide) and discontinued fluid administration.

OUTCOME AND FOLLOW-UP

After confirming a reduction in the peripheral oedema and pleural effusion and obtaining normal laboratory test results, excluding mild renal dysfunction, she was discharged 38 days after admission. At 72 days after her fall, she was engaged in her former occupation and had a healthy eating pattern. She was followed up for 72 days.

DISCUSSION

Older age, brain atrophy and coagulopathy are the risk factors associated with haematoma formation and progression after head injury.^{5–9} Coagulation disorder and brain atrophy accompanied by anorexia nervosa are considered the primary causes underlying the formation of acute subdural haematoma in young woman despite minor head injury. But few intracranial haemorrhages have been reported as a complication of anorexia nervosa.⁴

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To cite: Isono N, Santou K, Ueda N, *et al.* *BMJ Case Rep* 2019;**12**:e231156. doi:10.1136/bcr-2019-231156

Table 1 Initial and follow-up laboratory test results

Analysis	At admission	On day 3	On day 10
Albumin (g/dL)	2.7	2.3	2.0
Total bilirubin (mg/dL)	0.3	0.4	0.4
Glutamic oxaloacetic transaminase (U/L)	353	186	33
Glutamic pyruvic transaminase (U/L)	384	246	48
Blood urea nitrogen (mg/dL)	91.1	72.7	51.0
Creatinine (mg/dL)	3.98	3.27	3.00
Sodium (mEq/L)	169	164	147
Chloride (mEq/L)	131	128	115
Potassium (mEq/L)	4.3	5.0	5.0
Inorganic Pphosphorus (mg/dL)	–	2.2	2.1
Calcium (mg/dL)	–	8.1	8.4
Magnesium (mg/dL)	–	2.6	1.7
Glucose	113	66	99
White blood cell ($\times 10^9/L$)	4.41	4.25	3.02
Red blood cell ($\times 10^{12}/L$)	2.19	1.87	1.83
Haemoglobin (g/L)	67	58	55
Haematocrit (%)	22.6	19.0	17.7
Platelets ($\times 10^9/L$)	78	70	134

In general, acute subdural haematomas in young patients are associated with high-energy trauma, whereas in the elderly, they are associated with minor trauma.¹⁰ The cause of injury in the present case was fall, implying a low-impact injury. CT showed acute subdural haematoma without brain contusion. The clinical features in the present case are compatible with those of the elderly.¹⁰ Anorexia nervosa is associated with various medical complications.^{1–3 11} In the present case, the patient had thrombocytopenia, electrolyte disorder, renal and hepatic dysfunction and brain atrophy on admission. Hypothermia, severe liver impairments and thrombocytopenia may deteriorate blood coagulation and easily form subdural haematoma despite minor head trauma.^{3 5 9} Nutritional treatments that improve these medical

Figure 1 CT imaging at the first visit revealing the bilateral acute subdural haematoma and brain atrophy along with acute subdural haematoma on a chronic haematoma collection on the left side.

Figure 2 CT at 11 days after the injury revealing that the bilateral subdural haematoma had regressed, and the brain atrophy had reversed.

complications, including coagulation disorders, are considered to have prevented delayed haematoma enlargement in the present case.

Dystrophic changes in the brains of patients with anorexia nervosa are well known.^{2 9 12} Increase in subdural space owing to brain atrophy can provide space for haematoma enlargement.^{10 13} An atrophic brain can further increase stress on bridging veins, which may lead to subdural haematoma after mild head injury.¹³ However, brain atrophy accompanied by anorexia nervosa can be reversed with adequate nutrition.^{11 12} In the present case, nutritional management decreased the passive space available for subdural haematoma. Moreover, the resolution of brain atrophy is expected to restore psychological functions.¹² The patient in the present case finally acquired a healthy eating habit. In a previous report, cerebral infarction in the left thalamus cured anorexia nervosa. However, in the present case, no abnormal findings were noted in the brain parenchyma on CT. It has not been proven which nutritional treatments or the personal event of the hospital admission mainly treated anorexia nervosa.¹⁴

Cerebral atrophy and coagulopathy together led to the increased possibility of haematoma enlargement in the present case. Potentially fatal complications occur during surgery under general anaesthesia in severely malnourished patients; preferably, surgery in patients with severe anorexia nervosa should be postponed or be avoided.¹⁵ We believe that we must administer nutrition therapy soon after admission to prevent the need for high-risk surgery.

Figure 3 CT at 16 days after admission revealing the increased bilateral pleural fluid.

Patient's perspective

During my hospital stay, the physician, nurses, registered dietitian and physical therapists deeply cared for me. Typically, hospital stay appears to be gloomy for most patients, but it was an extremely valued time for me. Thanks to treatment and care, I can engage in my favourite task. Every day, I eat foods that are delicious and good for my health and would help me to gain my body weight.

In fact, I experience fatigue easily. I cannot run and climb up a mountain. Because I still have renal dysfunction, I regularly visit another hospital and receive intravenous injection for renal anaemia twice a month. However, I live with a happy mind because physicians and medical staff saved my life.

Learning points

- ▶ Anorexia nervosa likely leads to traumatic intracranial haemorrhage because of weakened muscle strength, other medical complications, coagulation disorders and brain atrophy.
- ▶ Nutritional management is essential for alleviating medical complications and for regression of brain atrophy.
- ▶ Neurosurgeons should be aware of specific medical complications of anorexia nervosa.

Moreover, physicians must provide complete care considering the refeeding syndrome in severely malnourished patients and restrict the initial calorie intake.¹⁶ Refeeding syndrome is defined as the metabolic alternations that develop due to rapid nutritional repletion in chronically malnourished patients.^{15 17} With attentive monitoring via ECG, anthropometry, head CT and blood tests, we were able to avoid fatal medical complications. However, we encountered unexpected oedema in lower legs and pleural effusion without cardiac failure. Improvement in electrolyte imbalance does not assure water balance, and antidiuretic hormone levels may continue to be low.³ Unfortunately, we did not perform an endocrinological examination at admission. Physicians must pay attention to inconsistencies between laboratory test results and physiological function in patients with anorexia nervosa.

To the best of our knowledge, no cases of acute subdural haematoma with anorexia nervosa have been reported yet. Patients with anorexia nervosa can easily experience falls because of decreased muscle strength, syncope and hypoglycaemic faints, which lead to complications such as intracranial haemorrhage and haematoma enlargement because of brain atrophy, coagulation disturbances and vascular fragility.^{4 6} Treatment is inaccessible in numerous cases of anorexia nervosa.¹¹ The age of patients with eating disorders is advancing¹⁸; the number of traumatic intracranial haemorrhage with minor head trauma is expected to increase in future. Many general physicians have limited knowledge regarding anorexia

nervosa.¹⁹ Moreover, most neurosurgeons who are unfamiliar with eating disorders may perform high-risk surgery, resulting in unexpected complications from the treatments. Knowledge regarding the serious medical complications of this disorder would also help neurosurgeons in managing such patients.

Acknowledgements The authors would like to thank Shinji Kawabata MD for useful discussions.

Contributors NI drafted the manuscript. KS, NU and TE provided nutritional supports for the patient.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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