Turkish Journal of Emergency Medicine 19 (2019) 154–156

Contents lists available at ScienceDirect

Turkish Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/tjem

Case Report

Wernicke encephalopathy following gastrojejunostomy: A case report and review of the literature

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ARTICLE INFO

Keywords:
Wernicke encephalopathy
Gastric outlet obstruction
Digestive system surgical procedures
Endoscopy

ABSTRACT

Introduction: Non-alcoholic Wernicke encephalopathy (WE) is a life-threatening condition, which is caused due to thiamine deficiency. We reported a case of non-alcoholic WE following gastrojejunostomy.
Case presentation: A 31-year-old woman was admitted to our tertiary care center complaining about intractable nausea and vomiting following her gastrojejunostomy. She had undergone gastrojejunostomy because of gastric outlet obstruction after a suicide attempt with scale-remover. Two weeks after gastrojejunostomy, the altered mental status and confusion were reported and she also had a reduced range of motion, dysarthria, generalized muscle weakness, and vertical nystagmus. She gradually became uninterested in surroundings. WE was considered a differential diagnosis, which was confirmed by magnetic resonance imaging (MRI). High-dose intravenous thiamine administration was done for the patient and her symptoms were improved. We also reviewed the PubMed to evaluate studies on WE following gastrointestinal surgeries conducted through the last 10 years.
Conclusion: WE is a rare presentation of gastrojejunostomy and it should be considered as differential diagnosis when patient had impaired mental status and other related WE symptoms following gastrojejunostomy. Early diagnosis and management of WE in the Emergency Department can reduce the mortality and morbidity of WE.

1. Introduction

Wernicke encephalopathy (WE) is an acute disorder of central nervous system, which can be caused due to thiamine deficiency. Acute mental confusion, ophthalmoparesis, and ataxia have introduced as the clinical triad of WE. It was first described by Carl Wernicke. Thiamine plays an important role in cerebral fuel utilization as an integral part of metabolic pathways.[1]

Thiamine deficiency and other related metabolic disorders, especially during increased metabolic demands, can cause an initially reversible nervous system injury due to overproduction of the reactive oxygen species and also destruction of the blood-brain-barrier (BBB).[2] Chronic alcoholism is the most common causative factor for thiamine deficiency, followed by malnutrition and the decreased thiamine absorption, i.e. gastrointestinal (GI) surgery, including bariatric surgery, gastrectomy, and colectomy known as non-alcoholic causes of WE.[3–5] Moreover, several GI predisposing factors can increase the risk of thiamine malabsorption and should be considered as the causative factors for WE.[5] Also, early diagnosis and management of WE in the Emergency Department (ED) can reduce the subsequent complications. In this case report, a patient with WE, who had frequent vomiting and had undergone gastrojejunostomy is described.

A systematic search was conducted through PubMed for case series, case reports, letter to the editor, and other published articles on gastrointestinal surgery leading to WE and published in recent ten years, during July 2009 to Jun 2019. The inclusion criteria included the studies published in English, French and Swedish, and also those reporting the age, gender, cause of surgery, and the time from surgery to WE diagnosis in the studied patients. The keywords were as follows: “Wernicke” or “Wernicke Encephalopathy” or “Wernicke's” or “Wernicke's Encephalopathy”.

Peer review under responsibility of The Emergency Medicine Association of Turkey.
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https://doi.org/10.1016/j.tjem.2019.08.001
Received 20 July 2019; Received in revised form 17 August 2019; Accepted 19 August 2019
Available online 22 August 2019

2. Case Presentation

A 31-year-old non-alcoholic woman with a history of depression was referred to our tertiary care center. She had attempted suicide by taking scale-remover and was immediately transferred to the hospital. Following initial evaluations, she underwent upper GI endoscopy, by which severe erythema, scaling, streaks of dark-red blood, friable mucosa in the esophagus, stomach, and duodenum with abundant exudate were found. The healing process was observed two days after endoscopy.

Ten days later, the patient had developed nausea and vomiting and reported oral feeding intolerance (OFI). Accordingly, she readmitted to the GI ward. Possible causes of nausea and vomiting, for example pregnancy, thyroid diseases, brain disorders, electrolyte disturbances, and intestinal obstruction were ruled out. The upper GI endoscopy showed gastric outlet obstruction due to severe pyloric inflammation. The consultant surgeon recommended surgery and the patient underwent gastrojejunostomy. Then the patient was discharged from the surgery ward with a stable condition and without any obstruction symptoms.

Two weeks after gastrojejunostomy, suddenly the altered mental status and confusion were reported, and she also had a reduced range of motion, dysarthria, generalized muscle weakness, and vertical nystagmus. The finger-to-nose examination was bilaterally impaired. She gradually became uninterested in surroundings. At this time, we faced WE, so neurological consultation and brain magnetic resonance imaging (MRI) were requested. The patient's signs and symptoms made WE as the most probable diagnosis. Finally, the brain MRI revealed high signal intensity in fluid-attenuated inversion recovery (FLAIR) sequence in dorsomedial thalami, tectal plate, and around the third ventricle, by which WE diagnosis was confirmed (Fig. 1).

High-dose thiamine administration was done for the patients as follows: In the first three days, the patient received 500 mg thiamine dissolved in normal saline intravenously and 250 mg thiamine dissolved in normal saline solution intravenously for the next five days followed by oral thiamin 250 mg/day. Five days later, the patient was awake; however she was intubated and apathetic. Through admission, the patient's conditions and the symptoms were continuously improved. A significant decrease in WE lesions were observed two weeks after MRI (Fig. 1). At discharge, the patient's abnormal gait and her mild dysarthria were improved. The four-month follow-up via neurological examinations showed her normal conditions.

3. Discussion

We reviewed the non-bariatric post-GI procedure of WE reported in patients worldwide between July 2009 and Jun 2019 (Table 1). A total of 10 patients undergoing GI surgery followed by WE, who had the inclusion criteria were descriptively analyzed in terms of demographic data, cause of surgery and the interval between clinical symptoms of WE and GI surgery. Among the reported cases, GI cancers were more prevalent than the others. The male gender was more prevalent (6/10) than female in the previous reports. The mean age of patients was 39.80 years, ranging from 11 to 65 years. The interval between GI surgeries and WE symptoms was 5 days–18 months. In the non-bariatric surgery patients, in 60% of the patients with WE, the symptoms were initiated within one month or earlier after GI surgery.

Underdiagnosis in WE is not low; Day et al.[6] reported 68% and 94% underdiagnosis in alcoholic and non-alcoholic WE patients, respectively. Unfortunately, this emergency condition has a high mortality rate up to 20% in WE patients who missing in diagnosis and have not received adequate treatment. Hence, the early diagnosis of WE in the ED, as an acute care ward that patients present there without prior appointment, can avoid wasting time and reduce the mortality rate and underdiagnosis of WE. Due to high missing rate in the diagnosis of WE patient, it should be considered as one of the common differential diagnosis in patients with altered mental status and other related symptom especially in patients with a history of malnutrition, post GI surgery, and alcohol consumption.

Moreover, this patient may need to respiratory support and airway management due to altered mental status and loss of consciousness. Fluid therapy, electrolyte correction may also be indicated. In patients with high suspected WE, parenteral therapy with thiamin should be considered and MRI should be performed for confirm WE diagnosis if

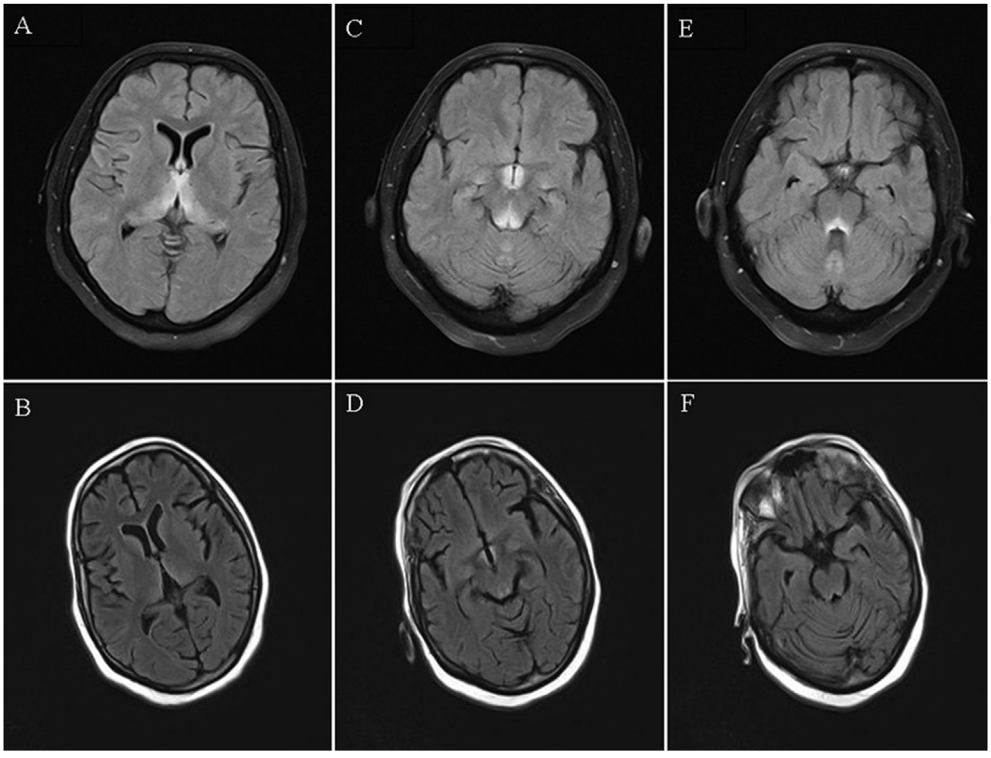

Fig. 1. A. High signal intensity in FLAIR sequence in the dorsomedial thalami; B. Signal change in the dorsal thalami after a month; C. High signal intensity in FLAIR sequence in the tectal plate and around third ventricle; D. Signal change in the tectal plate and periventricular area after a month; E. High signal intensity in the tectal plate in FLAIR sequence; F. Signal change in the tectal plate after a month.

Table 1
Review of previous non-alcoholic Wernicke's encephalopathy reports due to non-bariatric GI surgery in recent ten years.

Reported by	Year	Country	Age	Sex	Diagnosis/Type of Surgery	Interval between GI surgery and WE
D'Ettorre M et al.[4]	2018	Italy	62	Male	Rectal Cancer/Trans Anal Cancer Rescetion	5 Days
Kamasak T et al.[10]	2018	Turkey	11	Female	Brid Ileus after appendectomy/Ileal Bypass Surgery	1 Month
Kilinc O et al.[11]	2015	Turkey	38	Female	Head of Pancreas carcinoma/Whipple Procedure (Pancreaticoduodenectomy)	6 Days
Chen MH et al.[12]	2015	Taiwan	31	Male	History of Penetrating Abdominal Injury/Enterolysis	1 Month
Arita T et al.[3]	2015	Japan	58	Male	Distal Gastrectomy/Gastric Cancer	9 Months
Busani S et al.[9]	2014	Italy	46	Female	Stenotic Duodenopancreatectomy	12 Months
Arslan EA et al.[13]	2014	Turkey	13	Male	Duodenal Stenosis/Surgical Resection of Duodenal	18 Months
Renna R et al.[8]	2012	Italy	65	Female	Partial Gastrectomy/Gastric Cancer	1 Week
Onieva-Gonzalez FG et al.[14]	2011	Spain	27	Male	Duodenal Ulcer Bleeding/Cephalic Duodenopancreatectomy	1 Week
Karayiannakis A et al.[15]	2011	Greece	52	Male	Pancreatic Cancer/Pancreraticoduodenectomy (Whipple Procedure)	14 Months

this modality is available.

GI symptoms, ocular involvements, cerebellar signs, seizures, impairment of frontal lobe function, amnesia, and mental state impairment are common clinical manifestations of WE.[7] Although there are diagnostic triads in these patients, all aspects of the WE triad can be observed in only 8.2% of the patients, which is more common in alcoholic patients.[1] In the current report, the patient did not consume alcohol. However, she experienced severe protracted nausea and vomiting, which caused malnutrition.

Contrary to alcoholic WE, non-alcoholic WE may be prone to delay in diagnosis, due to the atypical clinical process and the interval between symptom and clinical diagnosis.[2] The suspicion of WE should be considered a differential diagnosis, when a patient who has a potential status of thiamine deficiency exhibiting dizziness, weakness, indifference, anorexia and memory disturbance. In the cases, who have two features of the Caine criteria, including malnutrition, altered mental state or amnesia, oculomotor abnormalities, cerebellar dysfunction, WE should be considered a differential diagnosis.[8] Delayed diagnosis and treatment can lead to the irreversible brain damage; accordingly the treatment should be initiated even if the paraclinical examinations are not available.[9] A historical report revealed the rate of 17% in acute WE patients. In addition, 84% of the patients who had received low doses of parenteral thiamine (50–100 mg/d) had irreversible memory impairment consistent with Korsakoff syndrome, among which only 16% made a full recovery.[7] Administration of 500 mg thiamine intravenously in a thrice-daily regimen seems to be normal.[1]

4. Conclusion

In conclusion, WE should be considered as one of the common differential diagnosis in patients with altered mental status and other WE related symptoms especially in post GI surgery patients. Early diagnosis and management of WE in the ED can reduce the mortality and morbidity in patients with WE.

Consent section

The informed consent was obtained from the patients for publication of the report and radiological findings, as well.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Author contribution statement

LA, ZM, and MN managed the patient. ZM and MK followed the patient. AJ reported imaging. MN reviewed the literatures. MN and LA wrote the draft. All authors revised and approved the final version of the manuscript.

Conflict of interests

The authors declare that they have no conflict of interest.

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