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Endoscopic Evaluation of Swallowing in Patient with Tetanus Followed by Myasthenia Gravis as its Complication

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Abstract: Flexible Endoscopic Evaluation of Swallowing (FEES) provides direct visualization of the pharynx and larynx immediately before and after a swallow in a patient with dysphagia. Dysphagia is the difficulty in swallowing solid or liquid food. It is a symptom of an underlying disease like tetanus and myasthenia gravis. This case report showed the important role of FEES in patients with dysphagia due to tetanus followed by myasthenia gravis as its complication. A 58-year-old man had complaints of severe difficulty in swallowing followed by complaints of fever and whole body seizures, which supported the diagnosis of tetanus. In the course of the disease, symptoms and the results of supporting examinations indicated the presence of myasthenia gravis. Comprehensive management had done with colleagues in internal medicine, neurology and medical rehabilitation. That condition improved and the complaints disappeared after one month. It can be concluded that FEES played an important role in diagnosing dysphagia. It could identify the modification of food consistencies and therapeutic maneuvers to prevent an aspiration for a patient with dysphagia as the early symptom of tetanus which caused neurotransmitter damage that broke muscle nerve junctions. It is also one of the predisposing factors for autoimmune conditions in myasthenia gravis. Correct diagnosis and comprehensive management give a better improvement for the disease.

Keywords: dysphagia; FEES; myasthenia gravis; tetanus

INTRODUCTION

Flexible Endoscopic Evaluation of Swallowing (FEES) is a diagnostic tool in Otolaryngology that provides direct visualization of the pharynx and larynx immediately before and after a swallow.[1,2] Dysphagia is a difficulty in swallowing food, whether it is solid, liquid, or both.[3] Dysphagia is not a disease but a symptom caused by an underlying disease. For individuals who demonstrate abnormal swallowing, modified consistencies and therapeutic maneuvers may be performed at the end of the examination. Dysphagia is often an early pathognomonic sign of tetanus and myasthenia gravis.[2,4] Based on the data, out of 106 patients with tetanus, 46% suffered from dysphagia, and 93% had trismus. In Turkey, out of 37 patients with tetanus, 78% had dysphagia as an initial symptom, and 92% had trismus.[5,6]

Tetanus is caused by an exotoxin produced by Clostridium tetani that causes damage to neurotransmitters and the neuromuscular junction[7,8] This exotoxin interferes with the release of neurotransmitters that inhibits the inhibitor impulse in strong muscle contraction and spasms, including swallowing muscles.[9,10]

Clinical symptoms are characterized by periodic muscle spasms without impaired consciousness and can be a fatal condition. Deficiency of immunity in tetanus patients can lead to autoimmune diseases. This condition can predispose to myasthenia gravis. Myasthenia gravis is an autoimmune disorder characterized

by an abnormal and progressive weakness in the skeletal muscles used continuously and accompanied by fatigue during activity and experiencing improvement after resting. One of the muscles affected is the chewing and swallowing muscles which cause dysphagia.[11]

This paper aims to report a case of the role of FEES in patients with dysphagia, which is an early symptom of tetanus followed by myasthenia gravis complications.

CASES

This case reported a 58-year-old man working as a carpenter. He came to the emergency room of RSDK with the main complaint of difficult swallowing for 20 days before he was admitted to the hospital. The patient could not swallow saliva, drinking water and solid food and liquid. A few days later, the complaint was followed by fever, stiffness and pain in most of the body when the patient moved and was stimulated by light. That complaint was felt for the first time. Complaints of hoarseness, shortness of breath and a lump in the throat were denied.

Physical examination showed that the body was weak. There were no open wounds or scars, drooling, subfebrile, and tonic seizures when the patient was asked to move and was given light stimulation. Oromotor, nose and ears examinations were within normal limits. The swallowing test found that the patient immediately vomited his food and choked. Laboratory tests showed leukocytosis and a normal chest x-ray. The working diagnosis of the patient was dysphagia with suspect tetanus.

The consultation results from internist college, the diagnosis, in this case, was in accordance with grade II tetanus. Initial therapy was given, including a dose of human tetanus immunoglobulin intramuscular and metronidazole intravenously for 500 mg/8 hours. Anticonvulsant therapy was intravenous bolus 10 mg diazepam and paracetamol 500 mg/8 hours. The researchers inserted nasogastric tubes on patients for dietetic purposes.

Panoramic X-rays revealed several carious teeth and roots, which the dental and oral surgery colleagues thought to be a port de entrée of tetanus. After one week of hospitalization, the patient experienced a fever-free seizure but still experienced difficulty swallowing and a hoarse voice throughout the day, which worsened in the afternoon and evening, without shortness of breath. The evaluation results with flexible endoscopy (FEES) identified pharyngeal phase dysphagia (the bolus cannot be swallowed), which showed a spasm in the laterolateral wall of the pharynx. The researchers consulted to colleagues in Physical Medicine and Rehabilitation for swallowing and speech therapy, and then the patient obtained a 6-series exercise schedule gradually adjusting to the patient's ability.

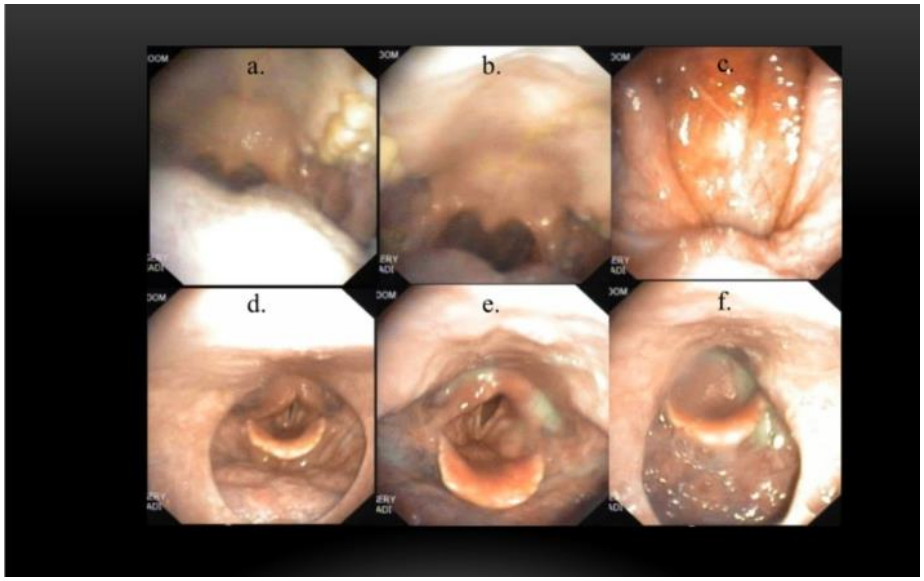

Figure 1. FEES Results: a. Cavum oris; b. Good oromotor function; c. Velopharynx is good; d. spasm of the lateral wall of the pharynx; e. The residue is at a pure consistency; f. Food penetration at puree consistency.

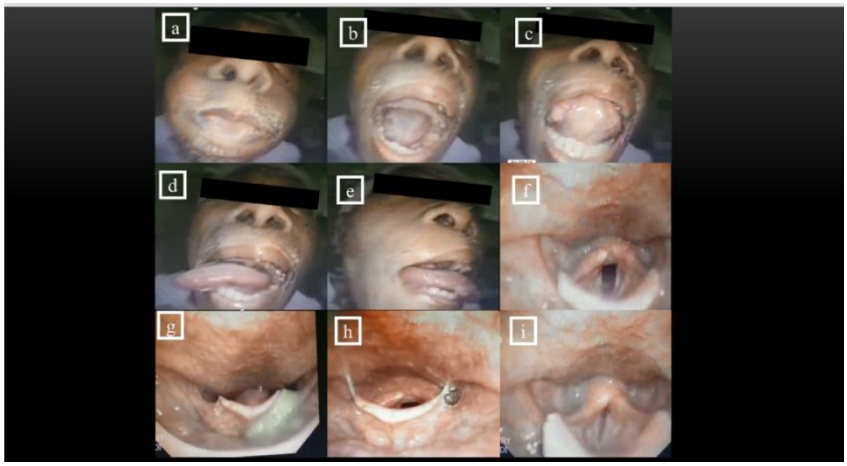

Figure 2. FEES results in 3 days after the first examination: an a-e motor examination of the oral cavity, oromotor function within normal limits of the oral cavity; f. The spasm of the lateral pharyngeal wall was reduced compared to the previous examination; g. Swallow food of pure consistency; h. Less residue on pure consistency; i. No food penetration was found in liquid to solid consistency after the patient swallowed several times.

The results of consultation with neurology colleagues with Repetitive Nerve Stimulation (RNS) examination found a wave image that supports the diagnosis of myasthenia gravis. The patient planned an anti-AchR immunological examination, but due to payment coverage constraints, it could not be done. Therefore, the patient was given pyridostigmine therapy (Mestinone) 60 mg/12 hours. The patient experienced improvement after 2 days of administration of Mestinone. It is the basis for the diagnosis of myasthenia gravis in the patient. The patient continued to experience improvement in both swallowing and motor activity.

The patient showed improvement after 22 days of hospitalization. The patient was able to eat porridge and drink a little. Patients were allowed outpatient care after 23 days of treatment with oral mestinone at a dose determined by the Neurology colleague. There were no complaints at the follow-up visit; the result of FEES still showed mild dysphagia. There was a reduced spasm in the lateral pharyngeal wall. There was food residue, but it slowly disappeared when the patient swallowed repeatedly. The swallowing process was better with the head down (chin tuck). One month after hospitalization, the patient could eat and drink well.

DISCUSSION

Dysphagia is a subjective or objective complaint related to difficulty swallowing, choking cough or difficulty chewing food and secretions. Dysphagia is not a disease but a symptom caused by an underlying disease such as neuromuscular disorders that play a role in the swallowing process. It is caused by blockages in the oral cavity, pharynx and esophagus, and the possibility of severe emotional disturbances.[12] Dysphagia is divided based on the cause into motoric, mechanical dysphagia and emotional disorders. Meanwhile, based on its location, dysphagia is divided into the oral phase, pharyngeal phase, and esophageal phase.[3]

Diagnosis of dysphagia is based on history, physical examination and diagnostic testing. One of the diagnostic tools for evaluating swallowing is Flexible Endoscopic Evaluation of Swallowing (FEES) with Sensory Testing. FEES is a study that directly visualizes the pharynx and larynx immediately before and after swallowing. The equipment required to perform FEES includes a flexible endoscope, viewing monitor, recording equipment and commercially available food testing materials. Technologic advances and equipment miniaturization allow the study to be performed in the clinic or at the bedside in a hospital or nursing home setting. A solo practitioner can perform the examination, but it is easier to have an assistant available to help feed the patient. FEES provides information about swallow initiation, penetration, aspiration, and the presence of pharyngeal residue. Advantages of FEES include its portability, relatively low cost, lack of radiation exposure, and the ability to evaluate various food substances and assess for pooling of saliva, laryngeal inflammation, neoplasm, and vocal fold function.[3]

Dysphagia is one of the early signs in patients with tetanus and myasthenia gravis, so patients often come to the ENT clinic first. FEES examination for evaluation of the ingestion process is by providing 6 food consistencies such as thin liquid, puree, gastric rice/ soft food, havermouth, and biscuits. All food consistencies except biscuits are colored green or blue for better visualization on inspection. The results of

the FEES examination, in this case, showed a spasm in the lateral pharyngeal muscles so that the patient could not swallow the bolus. It might be caused by neurogenic oropharyngeal dysphagia. The diagnosis, in this case, was dysphagia et causa tetanus grade II according to the modified tetanus degrees criteria from Ablett's classification: Grade 1 (mild): mild trismus, general spasticity (opisthotonus, stiff neck), no respiratory disturbances, no spasms, no dysphagia or mild dysphagia, no seizure; Grade II (moderate): moderate trismus, obvious rigidity/stiffness, mild to moderate brief spasms, moderate respiratory distress with a respiratory rate of more than 30 x/ minute, mild dysphagia; Grade III (severe): severe trismus, generalized spasticity: spastic muscles, spontaneous seizures, prolonged reflex spasms, a respiratory rate more than 40x/minute, apneic attacks, severe dysphagia and tachycardia more than 120; Grade IV (very severe): grade III coupled with severe autonomic disorders involving the cardiovascular system. Severe hypertension with tachycardia alternates with hypotension and bradycardia, which may persist.[10]

Clinical symptoms of tetanus are almost always related to the action of exotoxins (tetanospasmin) at the ganglion synapses of the spinal cord junction, neuromuscular junction and autonomic nerves.[13] Typically, clinical tetanus is due to the toxin tetanospasmin, which interferes with the release of neurotransmitters and inhibits impulse inhibitors that result in strong muscle contraction and muscle spasms. [9,10] The management is given an injection of Human Immunoglobulin Tetanus 3000-6000 IU followed by antibiotic therapy of metronidazole for 10 days. Supportive therapy like anticonvulsant and analgesia is given. Ensuring airway and fulfilling nutritional intake should be considered.[10,14]

The patient, in this case, experienced an improvement shown by the absence of spasms or muscle spasms. However, he still had symptoms of dysphagia, hoarseness and fatigue at night. It indicated a suspicion of myasthenia gravis.

Myasthenia gravis is diagnosed based on history and clinical symptoms. Supporting diagnostic to confirm myasthenia included the tensile test (edrophonium chloride), pyridostigmine test (neostigmine, mestinon), kinin test, immunological examinations, Antistriated muscle (anti-SM) antibody, antistriational antibodies, anti-acetylcholine receptor antibody (anti-AChR antibody), and examination using electrodiagnostic single-fiber electromyography or repetitive nerve stimulation (RNS). In this case, an RNS electrodiagnostic examination and a prostigmine test were performed, supporting the diagnosis of myasthenia gravis.[15,16] Patient was planned for immunological examination for anti-AChR antibody, but he was constrained by insurability of funding.

Anticholinesterase (acetylcholinesterase inhibitors) and immunomodulation therapy are the main management of myasthenia gravis. Anticholinesterase is usually used in mild myasthenia gravis. Meanwhile, routine immunomodulation therapy is necessary for patients with generalized myasthenia gravis.[17,18] Immunosuppressive and immunomodulating therapy, combined with antibiotics and ventilation support, can inhibit mortality and reduce morbidity in patients with myasthenia gravis. This treatment can be considered to restore muscle strength quickly and precisely, which has a slower onset but has a longer effect to prevent a recurrence.[19,20]

Evaluation of swallowing after clinical improvement in post administration of mestinone showed reduced spasm in the lateral pharyngeal wall. The patient could swallow even though there was still food residue. However, the residue would slowly disappear if the patient swallowed repeatedly.

CONCLUSION

Based on the result of this study, it can be concluded that FEES had been played an important role in diagnosing dysphagia. Furthermore, it could identify the modification of food consistencies and therapeutic maneuvers to prevent an aspiration for a patient with dysphagia as the early symptom of tetanus which caused neurotransmitter damage that broke muscle nerve junctions. It was one of the predisposing factors for autoimmune conditions in myasthenia gravis.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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