

**STROKE****Dysphagia Treatment in Pontine Stroke**

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**ABSTRACT**

Stroke is the most leading cause of dysphagia in which most stroke patients experience dysphagia or difficulties in swallowing and need Nasogastric tube (NGT) insertion for temporary feeding purposes. Patients who have swallowing difficulties or dysphagia are usually referred to the Speech Therapist (ST) in acute settings or for rehabilitation. Speech therapists will usually conduct a clinical bedside swallowing assessment for patients after stroke in acute settings. When a patient is not safe for oral feeding, NGT will be suggested to be inserted by ST. Patients with NGT need to undergo post-stroke rehabilitation therapy for weeks or months depending on the severity of the stroke whether the patient requires a long term NGT or short term NGT. Patients who showed risk of silent aspiration would undergo Fiberoptic Endoscopic Evaluation of Swallowing (FEES) as a gold standard objective assessment for swallowing. During acute settings if the prognosis of swallowing is poor, medical teams usually suggest Percutaneous Endoscopic Gastrostomy (PEG tube) insertion for acute stroke if long-term enteral feeding is required. Tube dependent oral areas for a longer time were higher in the lesions located on the pons and medulla than in lesions located

in other areas of the brain. Post stroke swallowing rehabilitation is important to look into patient progress. Aim of this study is to assist the speed recovery for patients with absent hyolaryngeal movement with using vital stim alongside with conventional swallowing therapy. A case study conducted on 83 years old female and 68 years old male diagnosed with acute pontine stroke. Patient presented with silent aspiration, absent hyolaryngeal excursion and absent pharyngeal sensation during Fiberoptic Endoscopic Evaluation of Swallowing (FEES). 83 years old female undergo conventional swallowing therapy whereas 68 years male undergo conventional swallowing therapy along side with Vital Stim Therapy. Both patients showed recovery of starting oral feeding and weaning off the nasogastric tube (NGT). However, an 83 years old female took almost 6 months to wean off NGT compared to a 68 year old male. Vital stim along with conventional swallowing therapy showed much more speed recovery compared to only conventional swallowing therapy.

**Keywords:**

*FEES (Fiberoptic Endoscopic Evaluation of Swallowing), NGT (Nasogastric Tube), Silent Aspiration, Hyolaryngeal Excursion*

**INTRODUCTION**

Stroke carries a high risk of death according to the World Health Organization (WHO). Stroke can cause temporary or permanent disability in which someone with stroke can experience loss of vision and / or speech, paralysis, confusion and swallowing difficulties. Dysphagia is the most common problem in stroke patients. Almost 65% of acute stroke have dysphagia (Jongprasitkul *et al.*, 2020). Patients after stroke who experience dysphagia or difficulties in swallowing may need a Nasogastric tube (NGT) insertion for temporary feeding purposes. Prior to insertion of NGT in most of the hospital settings patients will be referred to Speech Therapist (ST) in acute settings to assess patients swallowing abilities. Speech therapists will usually conduct a clinical bedside swallowing assessment for patients after stroke in acute settings. If a patient is not safe for oral feeding, NGT will be suggested to be inserted by ST. Patients with NGT need to undergo post stroke rehabilitation therapy for weeks or months depending on the severity of the stroke whether the patient requires a long term NGT or short term NGT. Managing dysphagia in acute settings is important to present risk of aspiration pneumonia, prolonged length of hospital stay and mortality rate which may directly affect an

emotion and a psychological health of patients. Patients who showed risk of silent aspiration would undergo Fiberoptic Endoscopic Evaluation of Swallowing (FEES) as a gold standard

objective assessment for swallowing. During acute settings if the prognosis of swallowing is poor, medical teams usually suggest Percutaneous Endoscopic Gastrostomy (PEG tube) insertion for acute stroke if long-term enteral feeding is required. Tube dependent oral areas for a longer time were higher in the lesions located on the pons and medulla than in lesions located in other areas of the brain. Post stroke swallowing rehabilitation is important to look into patient progress gaining the ability of swallowing. Functional Oral Intake Swallowing Scale (FOIS) will be used to measure severity of patients swallowing and their progress post rehabilitation. Therefore, the aim of this study is to assist the speed recovery for patients with absent hyolaryngeal movement with using vital stim alongside with conventional swallowing therapy.

## **METHODS**

### *Medical history*

A case study conducted on 83 years old Chinese female and 68 years old Malay male diagnosed with acute pontine stroke. Both patients were admitted at acute care settings post stroke. Both patients were referred to SLT for swallowing assessment prior to oral feeding. SLT conducted oral motor examination and bedside swallowing assessment prior to instrumental assessment and to start with dysphagia management and rehabilitation.

An 83-year-old Chinese female was presented with an underlying medical condition: diabetes melitus, hypertension, dyslipidemia, history of uterine cancer and Grade 3 diastolic dysfunction.

A 70 years old Malay male was presented with an underlying medical condition of hypertension, diabetes mellitus, dyslipidemia.

Both patients were diagnosed with acute pontine stroke. Both patients was able to ambulate themselves post stroke using a walker. Both patient was discharge post stroke 3-5 days.

### **Assessment of dysphagia**

Oral motor examination was conducted for both patients presented with intact cranial nerve VII symmetrical facial, CNV with adequate opening and closure of jaw and CN XII with adequate tongue range of motion and strength. No asymmetrical movement of tongue noted. Both patients presented with adequate oral motor functions. Bedside swallowing examination was conducted using Standardized Swallowing Assessment (SSA) on both patients presented with delayed initiation of swallowing with thin fluid. Patient was also presented with reduced to absent hyolaryngeal excursion and absent anterior movement across trials but with no overt symptoms during bedside swallowing examination which directly leads to instrumental assessment to search for risk of silent aspiration.

### ***Flexible Endoscopic Evaluation of Swallowing (FEES).***

Both patients underwent FEES immediately post stroke prior to insertion of NGT after a bedside swallowing examination. Patients were presented with absent laryngeal sensation, inadequate hyolaryngeal sensation which leads to aspiration during and post swallow aspiration presented with aspiration and penetration scale 8 in which materials enters the airway, passes below the vocal folds and no effort is made to eject (**Rosenbek *et al.*, 1996**). Patients presented with pharyngeal phase dysphagia characterized by inadequate hyolaryngeal excursion and delayed pharyngeal swallow resulting in post swallow diffuse pharyngeal residue and post swallow vallecular residue. There is during the swallow and post swallow aspiration of thin fluids and solids that is inadequate hyolaryngeal excursion. Both of the patients were presented with pharyngeal phase dysphagia.

Both patients were presented with FOIS scale 1 in which there were no oral trials, only NGT feeding. NGT was inserted after FEES assessment and feeding were taught by staff nurses.

## **RESULTS**

### ***Dysphagia management and rehabilitation: One month***

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Based on FEES results immediate post stroke, intensive rehabilitation took place in an outpatient dysphagia clinic. An SLT rehabilitation treatment plan was devised to address patients' pharyngeal phase. Both patients underwent dysphagia management and rehabilitation post stroke. The 83 years old female started with Mendelson, masako, ice chip swallow, chin tuck against resistance (CTAR). SLT treatment was delivered in daily sessions weekly 45 mins for patient swallowing therapy. Mendelson is conducted with a sip of water 10 times alongside with ice chip swallow, masako was conducted with 10 times and chin tuck against resistance as well. A 70 years old male was also started with post stroke rehabilitation with conventional swallowing therapy and vital stim therapy. Patient was also seen for a weekly session of 45 mins. Patient was started with vital stim in which it provides neuromuscular electrical stimulation (NMES) and surface electromyography (sEMG). Baseline of the patient was seen of 40uv of dry swallow. Vital stim therapy was conducted alongside Mendelson therapy, masako and ice chip swallow. Patient was able to view his swallowing effort via sEMG feedback therefore achieving target with Mendelson and effortful swallow was helpful in training the muscle. Both patients were repeated with FEES post swallow one-month weekly rehabilitation. A 70 years old male who went through vital stim therapy was able to achieve 60uv when doing sEMG whereas an 83 years old female showed improvement in her bedside hyolaryngeal excursion.

### ***Flexible Endoscopic Evaluation of Swallowing (FEES) : after one month***

FEES was repeated several times upon NGT removal depending on patients swallowing rehabilitation progress. 83 years old female went through FEES 4 times upon NGT removal whereas a 70 years old male went through FEES 3 times. FEES including the prior to NGT insertion. After swallowing a rehabilitation post one month patient, FEES was repeated again. This time 80 years old female was still presented with inadequate hyolaryngeal excursion,

absent laryngeal sensation and diffuse pharyngeal residue with silent aspiration during and after swallowing. FOIS scale 1 nothing by mouth. 70 years old male was able to tolerate some oral trials and indicated diffuse pharyngeal residue across trials, inadequate hyolaryngeal excursion, absent laryngeal sensation. This patient was presented with FOIS scale 2, tube dependent with minimal attempt of foods or liquid. The patient was allow dysphagia pureed diet trials and still cont NGT feeding.

***Dysphagia management and rehabilitation: 2-3 month of dysphagia rehabilitation***

Both patients continued swallowing rehabilitation with the same exercises prescribed. Patient still continued weekly swallowing rehabilitation after FEES. 83 years old female still continued with Mendelson, Masako, ice chip swallow, chin tuck against resistance (CTAR). The 70 year old man continued his treatment with conventional swallowing therapy and vital stim therapy. Continuation of vital stim therapy patient was able to achieve 80uv sEMG during 3rd month post stroke whereas 83 years old female showed some improvement during present hyolaryngeal movement for 5-10 trials of dysphagia pureed diet and absent after few trials during clinical bedside swallowing examination.

Flexible Endoscopic Evaluation of Swallowing (FEES): 2-3 month after dysphagia rehabilitation FEES was repeated for the second time post swallowing rehabilitation. This time 80 years old female was still presented with inadequate hyolaryngeal excursion, absent laryngeal sensation and diffuse pharyngeal residue with silent aspiration during and after some oral trials of dysphagia pureed diet. FOIS scale 2 tube dependents with minimal attempt of foods or liquid. 70 years old male was able to tolerate regular diet and thin fluids with minimal traces. Patient was safe for oral feeding and suggested for NGT removal with Fois scale 7 total oral diet with no restrictions.

## **DISCUSSION**

Swallowing rehabilitation is important for acquiring swallowing function as we know therefore providing the right intervention is very important. Dysphagia is a frequent finding in acute pontine infarctions, in this case patients with pontine stroke should be carefully examined for the presence of dysphagia (**Henke *et al.*, 2017**). In this study it is shown that patient had the same infarct pontine stroke in which it leads to silent aspiration. This patient appears seem able to swallow during clinical bedside evaluation which indicates motoric function is present but when these patients undergo FEES they seem having silent aspiration upon swallowing with deficits on sensory output.

Additionally, found that these patients with pontine stroke can lead to risk of silent aspiration and asymptomatic during bedside clinical swallowing examination. This study highlights the complexity and variability of dysphagia management in acute stroke patients. The incorporation of vital stim therapy alongside conventional exercises showed promising results in one patient, while the other exhibited slower progress. Factors such as age, underlying medical conditions, and individual response to rehabilitation interventions may contribute to these differences. In conclusion, this study underscores the importance of individualized and multifaceted dysphagia management approaches for stroke patients. While vital stim therapy appears beneficial for some, further research is needed to elucidate its efficacy in different patient populations. The study contributes valuable insights into the challenges and successes of dysphagia rehabilitation, paving the way for future investigations to refine and optimize therapeutic strategies in stroke care. However, not much study seen with acute pontine stroke and the relation of swallowing.

## **CONCLUSION**

Vital stim along with conventional swallowing therapy showed much more speed Recovery compared to only conventional swallowing therapy. Study shown patient has faster recovery period to acquire swallowing their swallowing function with combination of conventional swallowing therapy and Vital Stim therapy. Therefore, this would directly improve patient's quality of life in which they will be able to tolerate oral feeding.

## **SUMMARY**

Patient with pontine stroke of silent risk of aspiration showed to have reduce or absent laryngeal sensitivity. Therefore, using vital stim along side with conventional swallowing therapy showed to have much more speed time of recovery for patients with pontine stroke.

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