Effectiveness of Swallow Maneuvers and Thermal Stimulation in Management of Dysphagic Patients using National Dysphagia Diet Levels

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ABSTRACT:

Background: Trouble in swallowing food is defined as dysphagia. There are many factors that predispose the person to swallowing issues such as neurological, muscular, anatomical, and psychological. This study is being conducted to see the effectiveness of the two therapeutic techniques: thermal stimulation and swallow maneuver. Through the finding of best therapeutic technique, therapist will be able to give better intervention to patients.

Objectives: To explore the better treatment options among thermal stimulation and swallow maneuvers for therapy of the dysphagic patient.

Material and Methods: A Longitudinal experimental study design is used to find out the better treatment option among thermal stimulation and swallow maneuvers for therapy of the dysphagic patient. For this purpose convenient sample technique is used. Two groups A and B are made having 4 patients in each group. Group A received thermal stimulation and B group had swallowing maneuvers as a treatment option. Outcomes are measured through the national dysphagia diet levels. Thermal stimulation is given for 4-5 sec in one session/day and maneuvers are performed 5-10 times in a session twice a day and patient is re-evaluated after 10 consecutive sessions. Data is collected from different tertiary care units (Combined Military Hospital and Fatima Memorial Hospital) and evaluated on SPSS 16.

Results: Group A received thermal stimulation and B group had swallowing maneuvers as a treatment option. Among the two treatment options more positive results are seen through thermal stimulation. As four out of four patients showed progress through thermal stimulation from level 1 to level 3 on national dysphagia levels.

Keywords: Swallow Maneuvers, Dysphagia, Thermal Stimulation, Dysphagia Management

INTRODUCTION:

Trouble in swallowing food, semi -solid, solid, liquid, or any of themis defined as dysphagia. There are many factors that predispose the person to swallowing issues such as neurological, muscular, anatomical and psychological.(1)There are several behaviors that include (systematically or occur randomly) the oro-pharyngeal swallow mechanism. Characteristics of bolus (i.e. volume, viscosity) and voluntary control are responsible for the systematic changes. (2)

Swallowing is a complex process which requires voluntary and involuntary coordination of more than 40 pairs of muscles and several cranial nerves. The initial phase of normal swallow is termed the oral preparatory phase, characterized by lip closure, rotation and lateral movement of tongue and anterior bulging of soft palate to prevent premature spillage into the pharynx. Next is the oral phase, in which tongue is positioned midline and process the bolus against the hard palate. As the bolus touches the anterior tonsillar pillar, soft palate and oropharynx it triggers the pharyngeal phase. Bolus is then propelled through upper esophageal sphincter by the pulling of larynx, beginning the esophageal phase. In

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esophagus peristaltic movement propels the food to the stomach. The lower esophageal sphincter (LES) then retroactively closes to stoprevisit of the bolus into esophagus.(3)

Oral, pharyngeal and esophageal are physiological phases of swallowingthat can present symptoms of dysphagia. Common symptoms comprise of generalized feeding difficulty i.e. Poor competence, failure to thrive, and food refusal. Specific symptoms include tongue thrust, oxygen desaturation , choking, and cough.(4)

Factors like neurological, muscular, anatomical or physiological are most of the time responsible for predisposing a person to swallowing difficulty. Swallowing is a life saving process and misdiagnosis or swallowing difficulty not diagnosed can cause serious health hazardous consequences like aspiration pneumonia, malnutrition or even can lead to death. Well informed health care workersin collaboration with an interdisciplinary teammate are able to evaluate and diagnose individuals who are at risk for dysphagia, and amend the complications of dysphagia toimprovetreatment outcomes from beginning to end focused management (1)Age related neuromuscular dysfunction slows the muscle movements. This is shown in the swallowing process. Ingested bolus in the oral cavity may not be properly retained before the beginning of pharyngeal swallowing or beginning of pharyngeal swallowing may be hindered, which often causes silent aspiration. The mortality of aspiration pneumonia is quite high in the elderly(5)

The assessment and management of the dysphagia is a separate and a very complex field of practice and it requires long term care. But unfortunately deficiency of evidence base, the effectiveness of treatment is not recognized and many professionals without proper training are not familiar with proper and effective intervention.(6) a complete feeding history is required to recognize the possibility of dysphagia. The muscle tone and posture in head, neck and body are all examined and dysfunction is identified. Examination of oral cavity structures, reflexes, tongue movement and symmetry are all included in case of identification of neurological abnormalities. Gastro esophageal reflex or abnormalities in respiration can be identified during history or examination.Videofluroscopy, endoscopy and ultra-somgraphy are most commonly used for the investigation of dysphagia. (4) But gold standard consideration for oral-pharyngeal dysphagia is video fluoroscopy. (7)

Management of dysphagia is a multidisciplinary task that includes neurological, respiratory and gastrointestinal intervention.The areas that need attention for the proper management are six in number, they are management of posture and positioning, dexterity in food adaptation and feeding apparatus, oral-motor exercises, swallowing therapies, nutrition maintenance and intervention of co-morbidities.(4)

To make timing better for beginning the swallowing process some techniques are used e.g. thermal-tactile stimulation and bolus handling. Moreover, manipulation of bolus includes the making bolus chilled, sour, and large in volume or making it chewable. Application of pressure on tongue during giving food through spoon is also a helpful technique for initiating movement for fruitful swallow. Supra- glottic swallow, super supra –glottic swallow, effortful swallow and Mendelson maneuvers are four different swallowing techniques planned to alter the impaired function of the physiological stage of the pharyngeal swallow. Swallowingmaneuvers showed during videofluoroscopy shows abigger stretch in hyoid bone displacement. (8)

MATERIALS AND METHODS:

This is a study conducted on consecutive outpatient from age 55 to 65years with the mean of 61 years with swallowing difficulties due to of variety of reasons. Patients were enrolled in tertiary care units (Combined Military Hospital and Fatima Memorial Hospital). Out of eight patients seven were with stroke while only one was with a degenerative disease. Only those patients were integrated in the research with predetermined criteria of difficulty to swallow, able to perform the exercises and were conscious enough to carry out the instruction given to them for their dysphagia management. Out of eight

patientsthe etiology for dysphagia was stroke (4 hemorrhagic stroke, 3 ischemic stroke) and only one patient had Parkinson's disease. Two groups A and B were made having 4 patients in each group. Group 'A' received thermal stimulation and Group 'B' had swallow maneuvers as a treatment option. Outcomes were measured through the national dysphagia diet levels. Thermal stimulation was given for 4-5 sec in one session/day and maneuvers were performed 5-10 times in a session twice a day and the patient was re-evaluated after 10 consecutive sessions.

For measuring the outcome National Dysphagia Diet (NDD) were used. The idea of National Dysphagia Diet came into existence in early 90's to overcome the dispute amongst the healthcare givers, patients themselves and their caregivers.In those days a study told that there are about 40 different terminologies being used to describe solids and 18 terminologies for liquid consistency. That provoked the idea of forming National Dysphagia Levels. Speech and language pathologist (SLP) have a large range of tools available to see the patient's ability to chew and then swallow without risk.

All the levels of diet are summarized in four levels: level 1 (dysphagia pureed), level 2 (dysphagia mechanically altered), level 3(dysphagia advanced) and level 4 (regular diet). At level 1: diet consists of pureed, well mixed and consistent foods (moderate to severe dysphagia), at level 2: all foods in level 1 plus food that are soggy, malleable textured, and easily shaped bolus (mild to moderate dysphagia), at level 3: it comprisesof textures except very hard, sticky or crunchy (mild dysphagia) and at level 4: all foods allowed. The Longitudinal experimental study design is used to find out the better treatment option among thermal stimulation and swallow maneuvers for therapy of the dysphagic patient. For this purpose convenient sample technique is used. Data is collected from different tertiary care units and analyzed on SPSS 16.

RESULTS:

Table: Distribution of sample with respect to gender and age. N (No. of patient) =8

Gender	**Male**	**Female**
No.	**5**	**3**
Mean age (years)	**58.8**	**63.3**

Table 2: comparison of pre-treatment and post-treatment levels with respect to treatment option

Treatment option	**Pre-treatment level**	**Post-treatment level**
"Group A" (Thermal stimulation)	Level 1	Level3
	Level1	Level3
	Level2	Level3
	Level1	Level3
"Group B" (Swallow maneuvers)	Level1	Level3
	Level1	Level2
	Level1	Level2
	Level1	Level3

Pretreatment levels were recorded for every patient before giving any treatment seven out of eight patient were at the level 1 (pureed dysphagia) and only one was on level 2 (dysphagia mechanically altered).

Group ‘A’ received thermal stimulation and Group ‘B’ had swallow maneuvers as a treatment option. Among the two treatment options more positive results are seen through thermal stimulation. As all the patients exposed to thermal stimulation for 10 consecutive session reached from level 1 (dysphagia pureed) to level 3 (dysphagia advanced) on NDD. While with swallow maneuvers 2 out of four could achieve the level 3 from level 1.

DISCUSSION:

Results of a study conducted in 2009 showed that the effortful swallow maneuver by using biofeedback appears to be a therapeutic source in the rehabilitation of oropharyngeal dysphagia in the patients of Parkinson’s disease.(9)Another study carried in 2012 concluded that 55% of patients showed escape from risk of aspiration through the chin down posture, among them 40% were with pre swallow aspiration and 60% were with aspiration while swallowing. These percentages were similar for both stroke and traumatic brain injury (TBI).Silent aspiration was seen in 51% patients out of them 48% patients didn’t show any improvement with chin down posture. With cervical flexion 50% of patients with acquired brain injury showed escape from aspiration. And remaining 48% still showed aspiration even with maneuvers. Many video fluoroscopic evaluations are used to assess the inadequacy of the maneuvers. (10) Same thing is also detected in this study which tells that swallow maneuvers as a treatment option are not always helpful. There is evidence that pharyngeal squeeze maneuver is an effective substitute measure of pharyngeal motor integrity.(11)
In Japan ice massage is in tremendous use as a treatment to initiate the swallow process, even in daily basis swallow training. To check the proficiency of ice massage to initiate swallow reflex a cross study was conducted, 24 patients with the etiologies of stroke and CVA (cerebrovascular accident) were included in study and ice massages were given and results showed a remarkable shortening in time for initiation of swallowing reflex, even triggering of swallowing was seen in patient with no massage. The results told that immediate triggering of swallow reflex is seen through ice massage.(12) In our study icing massage also has a significant result in triggering the swallowing reflex and management of dysphagia. Study done for tactile and thermal oral stimulation effect on the cortical representation of swallowing in 2009 showed a remarkable augmentation in activation of both sides of cortex (bilateral cortical activation) in normal swallowing activity after oropharyngeal stimulation.(13) Many treatment options are approved proficient by researches including posture modification, longer pre-swallow sensory put in, controlled swallow maneuvers and exercises.(14)

No significant results were seen for the soft touch with a metal elbow; warm up to body temperature for stimulation, however, remarkable increase in swallowing reflex was brought by cold stimulation as compared to artificial stimulation. These results show that there is presence of thermo-sensitive receptors on faucal pillars that are stimulated by cold touch.(15) similar results are proved by our study. Department of Geriatric Medicine and Neurology, Malmo University Hospital and Sweden did a survey, including thirty eight patients with stroke with the age range of 53- 89 years. Only those patients were included who showed difficulty in swallowing on oral or pharyngeal in video fluoroscopic barium swallowing examination. Oral motor exercises, different swallowing maneuvers, posture and diet modification were included in intervention. Pre-treatment and post-treatment records for plasma protein levels, body composition, video fluoroscopic barium swallowing examination and an analogical scale were taken. Post-treatment record showed improvement in oral-motor functioning and pharyngeal functioning after treatment. Swallowing functioning as well as nutritional parameters were improved after swallowing therapy.(16)

CONCLUSION AND RECOMMENDATIONS:

In this study two treatment options 1: thermal stimulation and 2: swallow maneuvers are compared to discover and explore the most beneficial and useful treatment technique. According to this study, thermal stimulation is found to be more effective treatment strategy. Further researches are necessary for better conclusions. Due to limitation of short time period, less resources and small no. of sample size, results of this study can't be generalized; therefore, this study should be conducted on a large scale. Furthermore, the therapy session time should also be increased to see the efficacy and efficiency of the treatment and the outcomes of the therapy by combining both the treatment techniques.

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