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Dysphagia in Patients with Acute Ischemic Stroke in a Tertiary Care Hospital

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Abstract

Objective: The aim of this study was to investigate the frequency of dysphagia in acute ischemic stroke and relation with Glasgow Coma Score (GCS).**Methods:** The data of 54 patients with acute ischemic stroke were retrospectively analyzed. Glasgow Coma Scores were recorded. Modified Massey Bedside Swallow Screen (MBSS) was used for the diagnosis of dysphagia. For statistical evaluation MedCalc 15.8 software program (MedCalcBelgium) was used.**Results:** Fifty-four patients (n: 54) with acute ischemic stroke who were admitted to the study were followed up in our hospital Neurology Intensive Care Unit (NICU). Forty-nine of the patients were alive, transferred to our service, then discharged. Twenty-six patients had dysphagia (48.1%) while 28 patients did not have dysphagia (51.9%). Glasgow Coma Scores were lower in patients with dysphagia ($r=-0.628$, $p<0.0001$). Moreover, survival was inversely correlated with dysphagia ($r=-0.331$, $p=0.014$).**Conclusions:** Swallowing disorders can be associated with adverse clinical outcomes in patients with acute ischemic stroke in intensive care unit. It is also associated with survival and GCS. Dysphagia is common in ICU patients and should be carefully diagnosed since it can be an independent predictor of death.**Keywords:** Acute ischemic stroke; Dysphagia; Glasgow Coma Score

complications of dysphagia can continue. Dysphagia is a common complication that affects 76% of patients in stroke patients. It may persist for up to 6 months [5,6]. Stroke is the most common cause of neurogenic oropharyngeal dysphagia [7]. Dysphagia is a common morbidity after stroke, but widely different frequencies have been reported [8]. Dysphagia can cause aspiration pneumonia, dehydration, malnutrition and decreased functional independence [9]. The swallowing function is indispensable for life. It is known to be a complex procedure that requires voluntary and involuntary coordination of more than 40 pairs of muscles and several cranial nerves [10]. Many areas of the brain, especially the brain stem, thalamus, basal ganglia, cerebellum and motor and sensory cortex, associated with spontaneous and involuntary control of swallowing [11,12]. On the other hand cerebral lesions may block voluntary chewing control and bolus transport during the oral phase. Lesions of the pre-central gyrus may provide contralateral disruption in the face, lip and tongue motor control, and contralateral weakness in pharyngeal peristalsis. In case of cognitive functions impairment due to the cerebral lesions, such as concentration or selective attention also cause of disruption of swallowing control. Brainstem lesions are less common but reason of the largest swallowing weakness. These lesions may affect sensation of the mouth, tongue, and cheek, timing in the trigger of the pharyngeal swallow, laryngeal elevation, glottic closure and cricopharyngeal relaxation [13,14]. In this study, 54 patients with acute ischemic stroke were investigated for the presence of dysphagia and its association with GCS and survival.

Materials and Methods

This study was performed at Adana City Training and Research Hospital between September 2017 and Jun 2018. A total of 54 patients with acute ischemic stroke were included in this retrospective study. Patients who stayed at least 24 hours in NICU were included the study. Patients with haemorrhagic stroke, progressive neurological disease, tubal intubation and previously existing situations were excluded from the study. Additionally patients with a history of any gastrointestinal tract disease, pregnant or lactating women were also excluded. Finally, 54 patients were recruited due to the having enough alertness level and ability to process further for swallowing evaluation. To assess the ability to swallow safely a standardized screener that is Modified Massey Bedside Swallow Screen

Introduction

Swallowing is a complex function resulting from dysfunctions of the oral, pharynx, larynx, oesophagus, and respiratory muscles with other structures [1]. A swallowing disorder or decrease in swallowing ability is called dysphagia [2]. Dysphagia can be a life-threatening symptom in patients with stroke. Stroke has been the second most common cause of death and third most common cause of disability in the world [3,4]. People who have suffered stroke are susceptible to multiple complications. Most of complications can recover within a few week but

(MBSS) was used. In all cases, measurements were taken of the participants' glucose, lipids, AST, ALT, creatinine levels and complete blood counts. Glucose, lipids, ASTs, ALTs, creatinine levels were analysed on the Beckman Coulter Synchron LX 20 (Massachusetts, USA). Complete blood counts were measured by on the Sysmex XE 2100i (Japan). For statistical evaluation MedCalc 15.8 software program (MedCalcBelgium) was used. Mean standard deviation values of the data were recorded. The Student's t-test was used to compare normal quantitative independent data and the Mann-Whitney U-test was used to compare independent quantitative data without normal distribution. Pearson or Spearman's correlation coefficient was used to analyse the degree of association between two variables. A log transformation was used for the variables that were not normally distributed. Chi-square test was used to compare qualitative data. Data were assessed at 95% confidence interval and $p < 0.05$ values were considered as significant. Multiple regression tests (backward method) were used to analyse the relationship between a dependent variable and one or more independent variables (predictor variables or explanatory variables).

Result

A total of 54 patients (n: 54) with acute ischemic stroke who were admitted to the study were followed up in our hospital Neurology Intensive Care Unit (NICU). Forty-nine of the patients were alive, transferred to our service, then discharged. Twenty-six patients had dysphagia (48.1%) while twenty-eight of them did not have dysphagia (51.9%). Demographic data and biochemical values of the groups were shown on **Table 1**.

Table 1 shows characteristics of the groups.

	Dysphagia (+)	Dysphagia (-)	p
Age (year)	69.7 ± 11.9	70.8 ± 9.5	0.697
Female N (%)	16 (59.3%)	12 (46.2%)	0.442
Glasgow Coma Score	13.0 ± 0.19	13.8 ± 0.72	<0.001
Ex N (%)	5 (19.2%)	0	0.02

The mean age of the patients with dysphagia was 69.7 ± 11.9 and it was 70.8 ± 9.5 in patients without dysphagia ($p = 0.697$). Female/male ratio was 14/12 in dysphagia group while it was 11/17 in the control group ($p = 0.288$). The mean GCS was low in patients with dysphagia (13.0 ± 0.19 vs. 13.8 ± 0.72 , $p < 0.001$). A negative correlation was found between GCS and presence of dysphagia ($r = -0.628$, $p < 0.0001$) (**Figure 1**).

The frequency of dysphagia was also low in survived patients ($r = -0.331$, $p = 0.014$) (**Figure 2**). Multiple regression analyses (backward method) were performed with dysphagia as a dependent variable and with age, gender, and GCS, magnesium and lesion localization as independent variables. A significant correlation persisted between GCS and lesion localization ($p < 0.001$, respectively) (**Table 2 and Figure 3**).

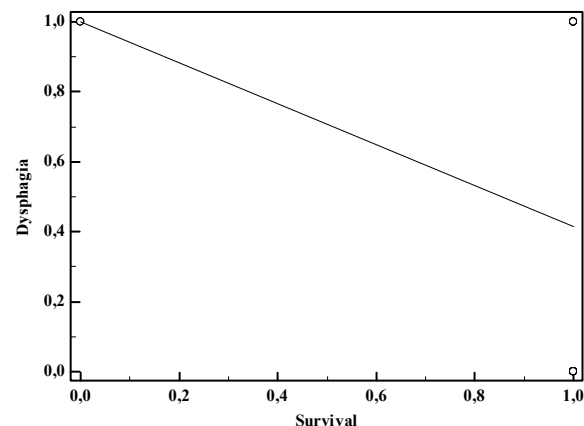


Figure 1 Relationship between dysphagia and survival.

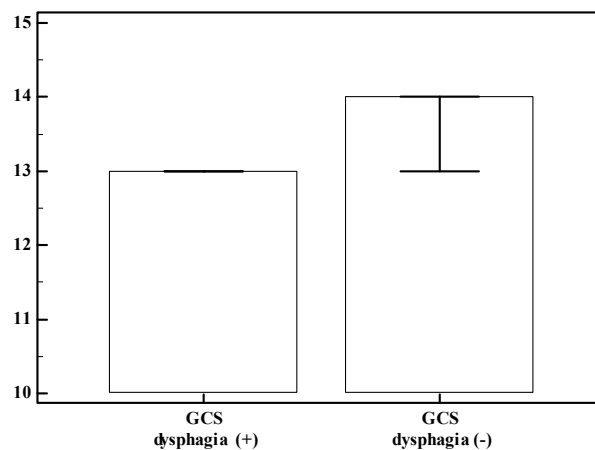


Figure 2 Relationship between dysphagia and Glasgow Coma Score.

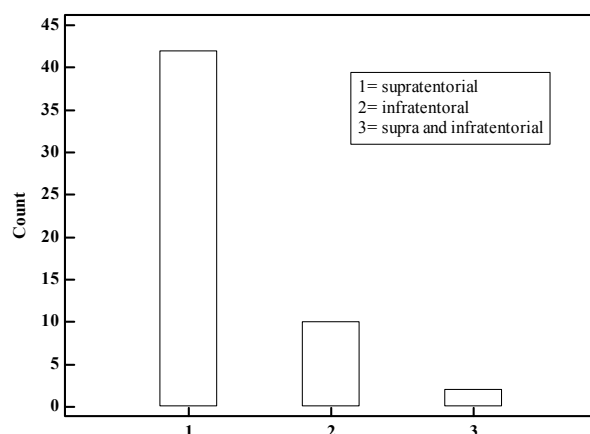


Figure 3 Lesion localization.

Table 2 Lesion localization.

Classification X	Lesion localization count	
Supratentorial	42	77.80%
Infratentorial	10	18.50%
Supra and Infratentorial	2	3.70%
Total	54	100.00%
Chi-squared test		
Chi-squared	49,778	
DF	2	
Significance level	P<0.0001	

Discussion

In this study, we investigated the frequency of dysphagia in patients with acute ischemic stroke in our NICU. We also analysed its association with GCS and survival. We have diagnosed dysphagia in an important part of the patients. Patients with dysphagia had lower GCS and survival rate. An important part of acute stroke management is detection of dysphagia. Literature suggested that swallowing difficulties can affect variable percentage of patients. Its incidence varies in different studies that may depend on the different screening procedure used, or be related to lesion localization. Dysphagia after stroke is an indicator of persistent disability, increased risk of chest infection, prolonged hospital stay, malnutrition, poor prognosis and mortality. The literature reported that frequency of dysphagia in the acute stroke is variable, ranging from 13% to 100% especially to Wallenberg's syndrome. According to studies that dysphagia is common in stroke patients. Although its incidence is different which is because of different screening methods, it can persist for a long time and may affect morbidity and mortality [15-21]. Hamidon et al. [22] reported that 41% of patients had dysphagia in their study. Ickenstein et al. [23] concluded that 21/50 (42%) patients had post-stroke dysphagia during their hospital course. The Glasgow Coma Score is generally used as a measure of the level of consciousness. Low Glasgow Coma Score affects swallowing function in a negative way. This situation is a natural consequence of a reduction in cognitive status. Stroke related aspirations are believed to be due to dysphagia result of aspiration of oropharyngeal material or gastric content after brain injury. Studies reported that dysarthria can cause mental stress and may increase gastric acid secretion. Stress-related mucosal diseases and ulcers may be the cause of acid aspiration. Acute stroke is regularly accompanied by dysphagia, impaired consciousness and other factors that lead to malnutrition. Due to unconsciousness and difficulty in swallowing, acute stroke patients are at great risk for acute respiratory distress syndrome associated with high mortality [24]. We have diagnosed dysphagia in 48.1% of the patients. Moreover, we observed an inverse correlation between dysphagia and survival in our study. This situation was predictable and not surprising for us. Even more compatible with literature findings [25].

Crary et al. [26] concluded that there was significant differences between GCS score of patients with dysphagia and patients without dysphagia (GCS: dysphagia subgroup: 13.4, no dysphagia subgroup: 14.8). The results of Crary and colleagues were similar but only 69 patients were included in their study. In addition, only 39 were ischemic strokes. The number of patients was limited (72 patients) in another study that Ikenaga et al. [27] was found Glasgow Coma Scale lower in patients with difficulty in oral intake. Brogan et al. [28] concluded that mild GCS disorder was statistically significant with dysphagia according to normal. They received ischemic and haemorrhagic total 378 cases. In our study which consisted of only ischemic cases, we saw such a result. We observed that dysphagia decreased as Glasgow Coma Score increased ($r=-0.628$, $p<0.0001$).

There were limitations and shortcomings in this study. The data of 54 patients with acute ischemic stroke were retrospectively analysed. Number of cases was not enough. Only intensive care processes were evaluated. More precise techniques such as video fluoroscopy could not be used.

Conclusion

Swallowing disorders can be associated with adverse clinical outcomes in patients with acute ischemic stroke in intensive care unit. It is also associated with survival and GCS. Dysphagia is common in ICU patients and should be carefully diagnosed since it can be an independent predictor of death. The presence of swallowing difficulties must be recognized early and meticulously. In some patients, swallowing difficulties may persist for too long. This condition, which can affect morbidity and mortality, should be managed very well.

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