

# Complications And Comorbidities In Patients With Qualitative Disorders Of Consciousness After Stroke

Ernestina Dostović<sup>1</sup>, Adnan Dostović<sup>2</sup>

Department of Anesthesiology and Reanimation, University Clinical Centre Tuzla, Tuzla, Bosnia and Herzegovina<sup>1</sup>  
Department of Neurosurgery, University Clinical Centre Tuzla, Tuzla, Bosnia and Herzegovina<sup>2</sup>

**Introduction:** In acute stroke, disorders of consciousness are common and significantly disable the patient, which is a risk for the development of complications.

**Aim:** To determine the frequency of complications and comorbidities in stroke patients with qualitative disorders of consciousness.

## Patients and methods:

100 consecutively admitted patients with qualitative disorders of consciousness in the acute phase of stroke were examined. The frequency of previous diseases and accompanying medical complications was determined. The control group consisted of the same number of patients with acute stroke who were not diagnosed with qualitative disorders of consciousness. The qualitative disorder was determined using the Delirium Assessment Scale and the criteria for delirium according to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders. Complications were confirmed by clinical examination, laboratory findings and chest radiography.

**Results:** Patients with qualitative disorders of consciousness had a statistically significantly higher number of complications ( $p= 0.0005$ ) with their different distribution. Pneumonia (24%) and urinary infections (27%) were the most common complications in post-stroke patients with qualitative disorders of consciousness. There was no statistically significant difference between patients with and without qualitative disorders of consciousness in relation to the frequency of previous diseases, as well as in relation to the occurrence of complications ( $p> 0.05$ ).

**Conclusion:** Patients with qualitative disorders of consciousness after a stroke develop a significantly higher number of complications. There is no significant difference between patients with and without qualitative disturbances of consciousness in relation to the frequency of previous diseases, as well as in relation to the distribution of complications.

**Key words:** stroke, complications, comorbidities, qualitative disorder of consciousness

## 1. Introduction

After a stroke, about 30% of patients develop an infection, of which about one-third is pneumonia (1). The development of an infection after a stroke is associated with a higher risk of poor outcome or death (1-4). Pneumonia in particular contributes to early mortality after stroke, and it has been estimated that 10% of deaths within 30 days after stroke are attributable to pneumonia (5-6). Limited data from small cohorts of patients suggest that most pneumonia occurs in the first 48 to 72 hours after stroke, but these studies assessed the development of pneumonia only during hospital admission or within the first week or month after stroke (7-10). The primary risk factor for pneumonia after stroke is thought to be dysphagia, which allows aspiration of ingested food, liquids, or oral secretions. There is evidence that treatment of dysphagia is associated with a reduction in the incidence of pneumonia.

Consciousness disorders are common in acute stroke. Strokes that cause disturbances of consciousness include cerebral infarction and hemorrhage involving extensive areas of both hemispheres, either limited regions: bilateral mesial regions, paramedian diencephalon, and upper brainstem. Patients who develop disorders of consciousness, ranging from somnolence to stupor and coma, need immediate admission to the intensive care unit (11,12).

Our goal was to determine the frequency of complications and comorbidities in patients with qualitative disorders of consciousness after stroke.

## 2. Subjects and Methods

### 2.1. Subjects

This is a prospective study conducted at the Clinic of Neurology of the University Clinical Center in Tuzla-Bosnia and Herzegovina on a sample of 100 consecutively admitted patients with qualitative disorders of consciousness in the acute phase of stroke. The frequency of previous diseases and accompanying medical complications was determined. The control group consisted of the same number of patients with acute stroke who were not diagnosed with qualitative disorders of consciousness. Both groups were matched according to gender, age, stroke location, type and severity of stroke.

The study group included patients who met the following criteria: confirmation of the diagnosis of stroke by computed tomography and/or magnetic resonance imaging of the brain; neuropsychiatric assessment of the presence of delirium performed within seven days after the stroke; Glasgow coma score >8; written consent to participate in the study by the patient or a member of the patient's immediate family.

Patients with a Glasgow Coma Score <8 on the day of neuropsychiatric examination were excluded from the study, as were patients with epileptic seizures at the onset of stroke, with aphasia, with verified previous dementia/cognitive impairment (based on heteroanamnesic data from the patient's relatives, data from previous medical findings) and based on Dementia Score testing (13,14) patients with verified alcohol abuse (defined as at least 5 drinks per day), patients with previously verified mood disorders (if the patient had been treated for a mood disorder at least once in their life, if they had been prescribed medication for this disorder and if they had used it for more than one month), patients who had previously taken medications that could cause delirium. Medical complications were recorded every day, from the moment of admission until discharge. Complications were confirmed by clinical examination, laboratory findings and chest radiography.

#### Dementia Assessment Scale (13,14)

One of the most commonly used versions of the Dementia Score is the version developed by

Hachinski et al. in 1975. The maximum score is 28 and indicates the highest degree of dementia. A score of less than 4 is considered normal, 4-9 is mild, and 10 and above is moderate to severe. Score values can indicate the degree of dementia progression during repeated examinations.

Qualitative disorder was determined using the Delirium Assessment Scale-R-9815 and the criteria for delirium according to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (16).

#### 2.2. Statistical analysis of results

Statistical analysis was performed using SPSS ver. 17.0 (Chicago, IL, USA). Standard statistical methods were used for qualitative and quantitative assessment of the obtained results from the basic descriptive statistical parameters. The Chi-square test was used to assess the statistical significance of the differences in the obtained results. All statistical tests were performed at a statistical probability level of 95% ( $p < 0.05$ ).

The research was approved by the Ethics Committee of the University Clinical Center Tuzla.

#### 3. Results

Delirious patients had a statistically significantly higher number of complications ( $p = 0.0005$ , Yates correction = 20.1,  $df = 1$ ) with their different distribution (Table 1).

**Table 1.** Frequency of complications after stroke in patients with qualitative disorders of consciousness

Complications		Complications				Total	p*-value
		With QDC		Without QDC			
		N	%	N	%		
Complications	With	62	31.2	29	14.6	91	0.0005
	With out	38	19.1	70	35.2	108	
Total		100	50.3	99	49.7	199	100.0

QDC- qualitative disorder of consciousness; \* Chi square test;

**Table 2.** Distribution of complications after stroke in patients with and without qualitative disorders of consciousness

Complications	Complications			
	With QDC		Without QDC	
	N	%	N	%
Pneumonia	23	24.2	6	6.3
Thromboembolism	1	1.1	1	1.1
Decubitus	5	5.3	0	0.0
Urinary tract infection	26	27.4	22	23.2
Injuries	11	11.6	0	0.0

There was no statistically significant difference between patients with and without qualitative disorders of consciousness in relation to the frequency of previous diseases (hypertension, diabetes, hyperlipidemia, cardiac disorders, chronic obstructive pulmonary disease), as well as in relation to the distribution of complications ( $p > 0.05$ ).

#### 4. Discussion

Organic, including symptomatic mental disorders are caused by cerebral damage/brain injuries or strokes that lead to cerebral dysfunction of different types and intensity. In them, an organic cause is known or such an etiology is assumed with probability. Primary dysfunctions of the brain directly damage the brain tissue, while secondary dysfunctions occur in somatic-system diseases and disorders that are primarily located on another organ or organ system and only indirectly affect the brain.

A stroke leads to focal or multifocal neuropsychological disorders. Given that in the "classic" clinical picture of a stroke, motor deficit, disturbance of consciousness and disturbance of speech functions are in the foreground, and very often also disturbance of the functions of other organ systems (e.g. cardiovascular, respiratory), most neuropsychological symptoms are observed after the acute phase when the patient's general and neurological status stabilizes, that is, when we are able to conduct neuropsychological tests.

The study, based on a large international database, confirms previous reports that approximately one in 10 patients develops pneumonia in the first 90 days after stroke and shows that almost 2 in 3 pneumonias occur in the first week. The peak incidence of pneumonia was on the third day after stroke, accounting for almost 20% of all pneumonias after stroke. Pneumonias occurred earlier and more frequently in patients with more severe stroke. The occurrence of pneumonia was independently associated with poor functional outcome or death at any time during the 90-day follow-up period. Smaller

previous studies have reported median or mean periods between the onset of stroke or hospitalization and pneumonia of 1.8 (8), 1.9 (16), 2.0 (17), 3.0 (9) or 4.4 days (10) observed a peak incidence on the second day (18) or found that most pneumonias occurred within 48 (7) or 72 hours (2, 10).

Many questions remain to be answered about the prevention of pneumonia after stroke. First, it is unclear how well dysphagia treatment prevents pneumonia. In practice, multiple treatments and strategies are used in various combinations to reduce aspiration, and treatments are often tailored to the individual. One study estimated the incidence of pneumonia in a stroke population after implementation of a comprehensive dysphagia treatment program, resulting in a 3-month pneumonia incidence of 1.8%, significantly lower than the prevalence of 8.1% found in this study (19). Two studies have shown that a formal dysphagia screening program reduces aspiration pneumonia, and one has eliminated it completely, although diagnostic criteria for aspiration pneumonia are not provided (21, 22).

Hénon et al report that delirium after a stroke is of significant frequency in the elderly, that delirious patients become functionally dependent on others, have an increased frequency of developing complications and a longer duration of hospitalization, an increased need for long-term institutionalization and an increased mortality rate (22). McManus et al reported that patients who develop delirium after stroke have high mortality, longer hospital stays, higher complication rates, and an increased risk of institutionalization and dementia (23).

In the acute phase of a stroke, patients with disorders of consciousness have a more severe stroke and higher mortality compared to patients without disorders of consciousness, complications were significantly more frequent in patients with disorders of consciousness, and disorders of consciousness in hemorrhagic strokes (12).

Our results on the frequency of pre-existing chronic diseases and new complications in patients with qualitative disorders of consciousness have been confirmed in previous research on this topic. The most common complications in our research were urinary infections and pneumonia, which can be explained by the fact that patients with qualitative disorders of consciousness are most susceptible to the development of these complications due to their reduced functionality and dependence on another person. Due to their reduced functionality and dependence on another person, patients who develop qualitative disorders of consciousness had a higher frequency of all verified complications compared to stroke patients who did not develop qualitative disorders of consciousness. There was no significant difference in the frequency of comorbidities between stroke patients with and without a qualitative disturbance of consciousness.

Stroke patients, and especially those who develop a qualitative disorder of consciousness due to the development of complications, often require treatment by an anesthesiologist due to the frequent life-threat caused by the aforementioned complications.

## 5. Conclusion

Patients with qualitative disorders of consciousness after stroke develop a significantly higher number of complications. There is no significant difference between patients with and without qualitative disorders of consciousness in terms of the frequency of previous diseases, as well as in terms of the distribution of complications. Patients after stroke who develop qualitative disorders of consciousness require increased monitoring and care due to the imminent development of complications, as well as a multidisciplinary approach and treatment.

## 6. References

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