General standards of nursing interventions in care and treatment of diabetic patients with acute stroke

Olivera Djurovic¹, Bratislav Stanković², Milenko Budimčić², Snežana Stanković¹, Snežana Radovanović³, Svetlana Radević³, Olgica Mihaljević³, Željko Vlasiavljević^{4,5}

1. Special Hospital for Cerebrovascular Diseases "Sveti Sava", Belgrade, Serbia

2. Academy of Professional Studies, College of Health, Belgrade, Serbia

3. Faculty of Medicine, University of Kragujevac, Serbia

4. University Clinical Center of Serbia, Clinic for Gastroenterohepatology, Belgrade

5. Higher School of Health Vocational Studies "Medika", Serbia, Belgrade

Corresponding Author:

Olivera Djurovic

Special Hospital for Cerebrovascular Diseases "Sveti Sava", Belgrade, Serbia

Nemanjina 2, 11000 Belgrade, Serbia

E-mail: oljadjurovic@gmail.com

Tel: +381 11 2066 822

Fax: +381 11 6642 014

Proces prihvatanja/Article history:

Primljen/Received 25.03.2021

Revidiran/Received in revised form 19.04.2021.

Prihvaćen/Accepted 29.04.2021.

OPŠTI STANDARDI SESTRINSKIH INTERVENCIJA U NEZI I LEČENJU BOLESNIKA SA DIJABETESOM I AKUTNIM MOŽDANIM INSULTOM SAŽETAK

Uvod. Šećerna bolest je čest metabolički poremećaj kod više od 1,7% svetske populacije. Šećerna bolest pogađa 3% populacije u Srbiji. Moždani udar je jedna od glavnih makrovaskularnih komplikacija šećerne bolesti.

Cilj. Utvrditi koje su razlike sestrinskih intervencija u nezi i lečenju dijabetičkih bolesnika sa moždanim udarom, u odnosu na bolesnike sa moždanim udarom koji imaju druge faktore rizika.

Materijal i metode. Istraživanje je sprovedeno u Specijalnoj bolnici „Sveti Sava“, na Intenzivnoj nezi B, u periodu od 1. novembra 2019. do 31. decembra 2019. U studiju je uključeno 40 ispitanika. Ispitanici su bili podeljeni u dve jednake grupe od po 20 pacijenata: prva grupa - eksperimentalna grupa sa ispitanicima sa akutnim moždanim udarom koji imaju šećernu bolest kao faktor rizika, a druga grupa - kontrolna, sa pacijentima sa akutnim moždanim udarom koji imaju druge faktore rizika. Studija je zasnovana na direktnoj i indirektnoj metodi istraživanja koristeći se opštim i naprednim skalama, koje su validirane u sestrinskoj praksi.

Rezultati. Prema „Ocenjivanje sestrinskih aktivnosti“ osnovnih sestrinskih intervencija: kontinuirano praćenje bilo je prisutno kod 13 (65%) pacijenata u eksperimentalnoj grupi, dok je kontrolna grupa imala 5 (25%) pacijenata. Monitoring vitalnih parametara i broj sestrinskih intervencija je bio znatno veći u eksperimentalnoj grupi ispitanika.

Zaključak. Korišćenje zajedničkih standarda sestrinskih intervencija u lečenju i nezi pacijenata sa akutnim moždanim udarom koji imaju i šećernu bolest zahteva uvećanje kadrovskih resursa medicinskih sestara-tehničara i veći utrošak vremena za sprovođenje plana nege i lečenja ovih pacijenata. Pacijenti sa moždanim udarom su kompleksni te je borba za prevenciju komplikacija prioritet u negovanju i zahteva individualan pristup.

Glavne reči: šećerna bolest, moždani udar, nega zasnovana na dokazima

ABSTRACT

Introduction. Diabetes mellitus is a common metabolic disorder with more than 1.7% of the world population. Diabetes mellitus affects 3% of Serbian population. Stroke is one of the major macrovascular complications of Diabetes mellitus.

Aim. Determining what additional intervention, care and treatment of diabetic patients with stroke needs, when comparing patients with stroke who have other risk factors.

Material and Methods. The research was conducted in the Specialized Hospital "Sveti Sava", at the Intensive Care B, during the period from the 1 November 2019 to the 31 December 2019. Total number of patients was 40. Subjects were divided into two equal groups of 20 patients: the first group- the experimental group with diabetic patients with acute stroke, and the second group- the control, with patients with acute stroke who have other risk factors. The study was based on general standards of nursing interventions, and advanced standards in the care and treatment of diabetic patients with stroke were used.

Results. According to "Nursing activities score" of basic nursing interventions: continuous monitoring was present in 13 (65%) patients in the experimental group whereas the control group that had 5 (25%) patients. Monitoring of vital parameters and the number of nursing interventions was much higher in the experimental group.

Conclusions. Using the common standards of nursing interventions in the care and treatment of diabetic patients with acute stroke is not enough. Their demands are highlighted and they require longer time and the increase number of nurses for the implementation of the plan of care and treatment for these patients. Patients with stroke are complex and prone to numerous complications and serious approach to each patient individually is needed.

Key Words: diabetes mellitus, stroke, evidence based nursing

INTRODUCTION

Diabetes mellitus is a common metabolic disorder with more than 1.7% of the world population suffering from it (according to some studies the number goes to 3.5%). Diabetes mellitus affects 3% of Serbian population, with a tendency to increase [1-7].

Stroke is one of the major macrovascular complications of diabetes mellitus, and when comparing the incidence of mortality it is the third cause of death in the world (right after cardiovascular diseases and cancer). 60% of patients with stroke have a hyperglycemia as well; even though diabetes wasn't mentioned in the history that has been previously given. It is believed that genetic predisposition together with participation of the environmental factors is involved in its ethiology [2, 8-10].

There are 2 types of this disease: type 1 Diabetes mellitus and type 2 Diabetes mellitus. Type 1 Diabetes usually develops rapidly since the day of birth, so the symptoms are more pronounced. Type 2 Diabetes for a long time doesn't cause any unusual problems as it is developed very gradually during a long period of time, and with concealed clinical signs. Sometimes the type 2 diabetes is detected only when the complications of diabetes occur [3, 5-8].

The health care of these patients is extremely complex and requires a good assessment of the patient's condition and a good care plan.

AIM

The aim of this research is to determine what additional interventions, care and treatment measures of diabetic patients with stroke should a nurse do, compared with those who have other risk factors.

The tasks of this research are:

- To examine in what measure diabetes is present as a risk factor in patients with stroke hospitalized in the Intensive care unit B in the "Sveti Sava" hospital
- To analyze other risk factor for stroke that were present in hospitalized patients, and to examine to what extent were they present in the total number of hospitalized patients.
- To determine type and the number of standardized nursing activities in diabetic patients with stroke in comparison to the group of patients with stroke that have other risk factors.
- To assess the state of consciousness of the diabetic patients with stroke
- To assess the risk of damaging the integrity of the skin in diabetic patients with stroke

- To examine the intensity of pain which is caused by the damages to microcirculation in diabetic patients with stroke

MATERIAL AND METHODS

The research was conducted in the Specialized Hospital for prevention and treatment of cerebrovascular diseases "Sveti Sava" in the Intensive Care unit B, in the period of 1.11.2019. to 31.12.2019. year.

Total number of patients was 40. Subjects were divided into two equal groups of 20 patients: the first group- the experimental group with diabetic patients with acute stroke, and the second group- the control, with patients with acute stroke who have other risk factors. The study was based on general standards of nursing interventions, and advanced standards in the care and treatment of diabetic patients with stroke were used.

Methods

- A. Descriptive method
- B. Indirect observational method
 - documentation analysis

Direct observational method:

- current (observation after some periods of time)
- interview

Techniques and instruments of the research: scaling techniques, interview and analysis techniques.

Instruments used in the research are:

I. Scales:

- Nursing Gold Standards in Intensive Care Units
- Nursing Activities Score (NAS), used for scoring nursing activities
- Glasgow Coma Score (GCS), used for the assessment of state of consciousness
- Norton scale, used for the assessment of the risk for decubitus ulcer
- Numerical scale for the pain assessment
- Admission nursing list as an interview questionnaire

II. Documentation:

- documentation of the process of medical care and the history of the disease

RESULTS

During the period of 1.11.2019. year to 31.12.2019. year, at the Intensive care unit B, there were 271 hospitalized patients with acute stroke. There were more

men than women in both groups of respondents. The prevalence of intensive care patients was approximately the same in both study groups (Fig.1, Fig.2). The major risk factors for stroke were analyzed. The major risk factor that was singled out was the one that was previously diagnosed, and for whom the treatment measures have been taken. If the risk factor hasn't been present in patients, it was noted as unknown risk factor (Table 1).

All the patients of the experimental group in their admission diagnosis had diabetes as a medical diagnosis, as well (Table 2 and 3).

According to the Glasgow Coma Score, the opening of eyes was monitored because it is the one of the best verbal and motor responses. In the group of diabetic patients there was 4 patients (20%) with the Glasgow score below 7 (which signifies coma), while there were no such patients in the control group.

According to the Norton scale, where the physical condition, mental status, movement, bed mobility and incontinence of urine and stool were monitored, in the group of diabetic patients there were 12 patients with high risk (60%).

According to the Nursing Activities Score (NAS), basic nursing interventions such as continuous monitoring (presence of the nurse with the patient with activities that last more than 2 hours per shift) was present in 13 patients (65%) in the experimental group, and in 5 patients (25%) in the control group.

After one hour, monitoring was requested for 4 patients (20%) in both the experimental and the control group of patients. Monitoring of vital parameters was requested after 3 hours for the rest of the patients of both groups. The demand for laboratory monitoring was significantly higher in the experimental group of patients (Fig. 3).

The most frequent oscillations that happened in the both groups of patients were those in arterial pressure and in the number and the quality of respiration. Interestingly, respiratory and cardiovascular support were more prevalent in the control group, while renal and metabolic support were more prevalent in the experimental group (Fig. 4).

Natural and enteral nutrition were present in both groups of patients, although most patients in the control group required enteral nutrition (Fig.5). The subjective feeling of pain was emphasized in the patients in the experimental group (Fig. 6). Hygienic procedures, together with mobilization and posi-

tioning procedures were carried out for more than 2 hours during the shift in 16 patients (80%) of the first group of diabetic patients, and more than 4 hours in 4 patients (20%). Whereas in the control group of patients, 12 (40%) of them were treated for more than 2 hours and the other 8 (40%) for less than 2 hours.

DISCUSSION

The results confirmed the fact that much more time should be given to the hygienic care of diabetic patients and it can be concluded that the hygienic care has a huge importance in the care of immobile patients with stroke, especially the diabetic patients with stroke. The impact that hygienic care has in the quality of recovery is invaluable, and it can be classified in the same category as timely treatment of stroke [5-8].

Working with the patient's family has been only informative so far, and slightly educational. Given that all patients belonged to the intensive care unit according to the seriousness of the condition, time that they had after visiting hours was spent on the family related explanations about the patient's condition, as well as on the advice on how they can help their loved ones. The family is trained on how to feed the patients, how to establish communication with the patient and how to use stimulative effects for better recovery [9, 20-22].

The recommended standard- Nursing Gold Standards in Intensive Care Unit showed much more critical results of patients at risk, around 90% in the group of diabetic patients, whereas 50% of such patients from the control group of patients who had other risk factors. This way we were able to identify a shocking data- there was a lack of nurses who had to treat those patients. 4 nurses have been engaged for the care of patients in the first group, whereas 3 nurses were engaged for the care of patients in the second group during the first shift, while the other two shifts had even fewer nurses. It is a large deviation from the standard which consists of 8 nurses per shift [10-14].

Nurses have exceptional responsibility when implementing nurses interventions and also for the timing of the administration of insulin and other medications for diabetic patients on the one hand, and on the other- to prevent aspirations of food into the airway of the patients that have trouble swallowing [10]. Patient's nutrition demanded diabetic diets for every patient in the group of diabetic patients; whereas in

only 6 people with rises of blood glucose levels from the group of patients with stroke that have other risk factors. This data supports the fact that over 60% of patients with stroke have hyperglycemia, even though they are not diabetic. Researches of the nurses from the Republic of Croatia (Croatian Journal of Public Health) showed similar results in separate studies of patients with diabetes and patients with stroke as well as other studies [11-18].

The number of all the nursing interventions was enormously increased in the group of diabetic patients. Whereas the cardiac and respiratory support were slightly more increased in the control group of patients. Metabolic support was increased in the experimental group of patients, where there was frequent need for the correction of acid-base status. Renal support for monitoring of renal diuresis was also increased in the group of diabetic patients (65%). According to the information in literature, pain that is associated with diabetic neuropathy is sometimes missing, but it was not the case in this study, although there was no recorded data on diabetic neuropathy [10].

Nurse's diagnosis, outcomes and nursing interventions in this study

Patient's problems:

- Imobility
- Altered state of consciousness
- Vertigo
- Sickness, disgust
- Vomiting
- Altered visual perception (diplopia)
- Discomfort caused by the inability to hold urine and stool
- Pain in the stomach area- inability to urinate
- Swallowing difficulty
- Feeling of suffocation
- Difficult communication

Nurse's diagnoses:

- Potential damage to the integrity of the skin caused by immobility, which is usually manifested with transient redness
- Altered state of consciousness
- The risk of falling due to the dizziness and changes in the visual perception
- Subjective discomfort associated with the urge to

vomit, which is manifested with nausea and disgust

- High risk of aspiration, due to the dysphagia and vomiting
- Altered elimination of urine and stool which is connected with the inability to control sphincter, manifested as incontinence of urine and stool, or as pain in the stomach and urine retention
- Altered food intake related to primary illness, manifested as swallowing difficulty
- Inefficient drainage of secretions from the respiratory tract, manifested as suffocation
- Deterioration of communication

Outcomes:

- The integrity of the skin won't be damaged
- The improvement of the state of mind will occur
- The symptoms of vertigo, nausea and disgust will be reduced.
- Will be no aspiration of vomit
- The improvement in visual perception will occur
- The problem of urine and stool retention will be removed, abdominal pain will disappear
- The airway clearance will be sustained
- A better communication will be developed

Standardized interventions of the nurses and care plane

Patients with stroke, whose body part have been paralyzed, become immobile, and the starting risk assessment for decubitus ulcer is of great importance so that preventive measures could be taken at the right time. With nurses history, the Norton scale is widely used for the risk assessment of decubitus ulcer. At the same time, the Morse scale is used for the risk assessment of falling. Plan of care, which is individual for every patient after the assessment, is the foundation of interventions [4-8].

Undeniably, it is essential that these patients receive proper bed with anti decubitus mattresses or other improvised aids, such as protected fences which improve patient's safety. In order to prevent other immobility complications- thrombophlebitis, hypostatic pneumonia, urinary tract infections and others, corrective positions, hygienic treatment, full body massage (especially on predilection places) with nourishing oils and the changes of patient's position every 2 hours are of vital importance [12-15].

Due to the good perfusion, the patient's head is slightly elevated at 30 to 45 degrees. Breathing exercises and percussion are the standard procedures for the prevention of hypostatic pneumonia [10-12]. Any participation of the patient in self-care activities with his remaining abilities, and the inclusion of the family favourably affect the recovery process.

In order to improve vertigo problem, it is important to explain to the patient that it is a passing phenomenon, with the emphasis on the patients not making any sudden movements. If the visual perception is altered, the patient should be assisted by alternative closing of an eye [11, 12-18].

Therapeutic support, with the physician instructions, will certainly relieve sickness, nausea and vomiting, although monitoring of the patients is essential in order to prevent possible aspiration. Permanent monitoring in the acute phase of the disease is essential, and it includes 24-hour supervision. As far as incontinence of urine and stool is concerned, the application of adult diapers is preferred, unless the monitoring of urination is required. It greatly reduces the inconvenience that may occur with the patient. Bladder catheterization always carries the risk of urinary tract infections, so careful preventive measures, placement and maintenance of urinary catheters should be considered [11-14, 19-22].

The problem with swallowing must be carefully assessed in order for the best solution to be selected. The nasogastric tube in the absence of the swallowing reflex is a solution, and its good maintenance is necessary to prevent infections. Parenteral nutrition is not an option, because the latest findings speak in favor of the immune barrier in the gut, so the enteral nutrition is a priority. According to the assessment of the situation, patients monitoring of vital parameters are of outmost importance to the recovery, and nurses must be well trained to recognize such abnormalities, so it could be responded in time [13-19].

A common problem of patients is communication due to the inability to speak or understand speech, so patience when communicating with those patients should be a common trait of the nurses. The involvement of family is also very important, as well as resorting to modern stimulation methods of treating patients with stroke [12-15].

It is necessary to include other members of the team such as: a speech therapist, psychologist, dietician, social worker; although, the mandatory team members are: a nurse, neurologist, internal medicine specialist and physical therapist [12-22].

CONCLUSION

1. According to the obtained results, it can be concluded that all the goals and objectives of this study have been realised.
2. Interventions of the nurses in the care and treatment of diabetic patients with stroke are extremely complex and specific. According to the assessment of the situation, when comparing nursing interventions in the care and treatment of diabetic patients with stroke and patients with stroke who have other risk factors, it was found that there should be additional nurses activities in the care of those patients.
3. All standardized nursing interventions in the care and treatment of diabetic patients should be emphasised and require a longer time and greater involvement of nurses for the implementation of that treatment plan. However, as the patients with stroke are complex and prone to numerous complications, they are in need for serious and individual approach regardless of risk factors.
4. The results have shown that the scales that were used in this study are applicable in everyday practice, and that they are useful in the evaluation of the nurses work. They give results of current situation on the number and type of nursing interventions, the workload of nurses in health-care team, and about the number of nurses that differs from the standardized number, according to the severity of patient's condition.

IMPLICATIONS FOR NURSING PRACTISE

The scales that were used in this study are applicable in everyday practice.

Conflict of Interest: None

Funding: None

Gratitude

Thanks to my dear associate Bogdan Mitic for translating the text.

Table 1. Distribution of patients according to the possession of major risk factor for stroke (N=271)

Risk factors	The number of patients	Percent ratio (%)
Diabetes mellitus	67	24
Arterial hypertension	92	34
Cardiovascular diseases	37	14
Hyperglycemia	21	8
Obesity	19	7
Unknown risk factor	35	13
Altogether	271	100

Table 2. The main diagnosis after admission in the experimental group (N=20)

Diagnosis	The number of patients	Percent ratio (%)
St. post CVI	6	30
Hemiplaegio l. dex.	5	25
Hemiplaegio l. sin.	3	15
Comma	4	20
Bihemiparesispp.l.sin. inv.	2	10
Altogether	20	100
Altogether	271	100

Table 3. The main diagnosis after admission in the control group (N=20)

Diagnosis	The number of patients	Percent ratio (%)
Sy. vertiginosum	11	55
Episymptomatica	3	15
HIC	5	25
Hemiplaegio l. dex.	1	5
Altogether	20	100
Altogether	20	100
Altogether	271	100

Fig. 1. Distribution of the experimental group of patients according to the Nursing Gold Standards scale (N=20)

Fig. 2. Distribution of the control group of patients according to the Nursing Gold Standards scale (N=20)

Fig. 3. Distribution of the patients according to the NAS scale- laboratory tests 3 or more times a day (N=40)

Fig. 4. Distribution of the patients according to the NAS scales depending on the impact on their organs system (N=40)

Fig. 5. Distribution of the patients according to their diet (N=40)

Fig. 6. Distribution of the patients according to the Numerical scale for pain (N=40)

REFERENCES

1. Powers WJ, Rabinstein AA, Ackerson T, Adeoye OM, Bambakidis NC, Becker K. et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. 2019; 50:e344-e418.
2. American Diabetes Association. Standards of Medical Care in Diabetes-2019. *J Appl Res Clin*. 2019; 50:s90-s103.
3. Hinkle J.L, Fitzpatrick E. Needs of American relatives of intensive care patients: Perceptions of relatives, physicians and nurses. *Intensive & Critical Care Nursing*. 2011;27(4):218-225.
4. Elizateth S.Nursing Activities Score, Nurse Patient Ratios, and ICU Mortality: Its More Complicated Than That. *Crit Care Med*. 2020; 48: 126-127.
5. Basic Concept in Nursing Practice, Assessment on Neurologic Function, Hudson (OH), 2001.
6. Roth et al. Global, Regional and Nacional Burden of Cardiovascular Diseases for 10 Causes. *JACC J AM COLL CARDIOL*. 2017; 70 (1):1-25.
7. Oxford Textbook of Public Health, Fifth Edition, ISBN-13: 9780199218707, Oxford University Press, 2018.
8. Boskovic S. Health care in internal medicine, School of Applied Health Sciences, Belgrade, 2012
9. Guidelines for diagnosis and treatment of ischemic stroke, Ministry of Health of the Republic of Serbia, Belgrade, 2012.
10. CatanguE.Improving Glasgow Coma Scale (GCS) Competency of Nurses in One Acute Stroke Unit - A Nursing Initiative Project.2019;
11. Nikitara M, Constatinou C, Andregu E, Diomidous M. The role of nurses and facilitators and barriers in Diabetes care: A mixed ethods systematic literature review. *Behav Sci*. 2019; 9(6): 61.
12. Kekus D.Comunication in the professional practise of health care workers, School of Applied Health Science. Belgrade. 2010
13. Konjikusic V, Kocev N. Health care in rehabilitation process, Belgrade. 2005.
14. Maksimovic M. Health care in neurology, School of Applied Health Sciences, Belgrade, 2009.
15. Manojlovic D. Internal medicine, Institute for textbook publishing and technical aids. Belgrade. 2006.
16. Manojlovic S. Standardisednursing activities in endocrinology and endocrine surgery, Good practise guideline. Licej. Belgrade. 2010.
17. Manojlovic S. Matić Dj.: Health care in internal medicine, Institute for textbook publishing and technical aids. Belgrade. 2010.
18. Manojlovic S. Emergency conditions in internal medicine, Institute for textbook publishing and technical aids. Belgrade. 2011.
19. National guidelines of good clinical practice Diabetes Mellitus, Ministry of Health of the Republic of Serbia. Belgrade. 2012.
20. Rudic R, Kocev N, Muncan B. Health care process. Knjigakomerc. Belgrade. 2005.
21. Rankovic Vasiljevic R. Metodics and organization of health care, School of Applied Health Sciences. Belgrade. 2004.
22. Corluka V. Standardised activities od health care and treatment of patients, Guidelines for nurses- technicians and accoucheuses, Association of nurses and technicians of Serbian Clinical Centar, Belgrade. 2007.