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Original Research Article

MORBIDITY PATTERN IN ISCHEMIC STROKE PATIENTS AT A TERTIARY CARE HOSPITAL OF SOUTHERN PUNJAB

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Abstract: *Medical complications are commonly encountered by neurologists all over the world among ischemic stroke patients. Hence, this study was done to ascertain the burden of such medical complications.* ***Objective:*** *To document the pattern and burden of different medical complications in patients with ischemic stroke at a tertiary care hospital.* ***Methods:*** *This cross-sectional study was conducted at the Department of Neurology, Nishtar Hospital Multan. Stroke patients have undergone relevant investigations like urine tests, blood tests, and ECG for diagnosis of different medical complications such as UTI, shoulder pain, arrhythmia, pneumonia, and hyponatremia. Data was entered and analysed using the computer program SPSS-22.* ***Results:*** *Among these patients, 55.8% were male patients versus 44.2% were females with mean ages of 50.68± 7.18 years. Diabetes was noted in 23.8 %, hypertension was reported in 65.2%, and obesity was noted in 29 (16%). The previous history of stroke was 11.6%, the family history of stroke was 20.4%, and 23.8 % were smokers. Serum sodium level was presented as Mean value of 135.89 ± 1.95 mEq/L, urinary tract infection (UTI) was diagnosed in 48.1%, shoulder pain was 39.8%, pneumonia in 23.8%, arrhythmia 32 % and hyponatremia 28.2%.* ***Conclusion:*** *A high burden of medical complications among ischemic stroke patients was observed, with UTI as the most prevalent complication, which was followed by pain in the shoulder, arrhythmias, pneumonia, and hyponatremia. Our study results emphasise the need for careful monitoring of stroke patients to avoid these complications, which exert extra pressure on healthcare settings and are also associated with significant increases in healthcare-related costs.*

Keywords: Ischemic Stroke, Medical Complications, Frequency

Introduction

Stroke, a global health problem, is one of the main causes of functional disability and deaths all over the world, particularly in developing countries like Pakistan (1). The outcomes among stroke patients are not only consistent neurological deficits, but they are also highly deconditioning (2). At rehabilitation centres, stroke patients predominate all other patients who regularly need rehabilitation services for functional stability. These patients are always vulnerable to different complications during the rehabilitation phase due to the stroke as well as disabilities (3). Ischemic stroke occurs when an obstruction in blood vessels leads to a stop in blood supply to the brain and accounts for over 60 – 90 % of all stroke patients reporting to emergencies in Pakistan (4-6). During the last 2 decades, due to revolutionary advances in diagnostic and treatment approaches, outcomes have shown considerable improvements, but morbidities and mortalities in these patients are still alarming. Stroke survivors are always at increased risk of acquiring medical complications, neurologic deficits, and psychological issues (7). Such Medical complications, even if they are not life-threatening, hurt functional recovery, significantly increase hospital stay, and poor prognosis, which increase healthcare costs and hence puts an extra burden on suffering families as well as healthcare authorities. Moreover, its high proportion among young persons also hinders their productivity and work loss, which ultimately negatively impacts the national economy for their social services. Some patients also require to be shifted back to acute care health facilities leading to interrupted inpatient rehabilitation services, increasing the overall cost of treatment and stroke management (8). Stroke can result in various medical complications that can significantly affect overall health and quality of life. Common issues include motor impairments, such as weakness or paralysis, typically on one side of the body, and speech or language difficulties, like aphasia (8). Cognitive challenges, including memory problems and trouble focusing, are also prevalent. Emotional effects, such as depression or anxiety, frequently arise, and reduced mobility increases the risk of conditions like pneumonia and urinary tract infections. Swallowing difficulties (dysphagia) can lead to malnutrition or aspiration pneumonia (9). Additionally, stroke survivors may experience post-stroke seizures, chronic pain, or spasticity. The long-term risk of recurrent strokes and cardiovascular events also increases. Comprehensive management and rehabilitation are crucial to addressing these complications and improving recovery.

Methodology

A total of 181 patients with ischemic stroke were included in this cross-sectional study having their ages ranging from 25 – to 65 years at the department of Neurology Nishtar

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Hospital Multan. Patients having hemorrhagic stroke, bleeding disorders, brain cancer, pre-existing mental disorders, meningitis, chronic lung disease, and arrhythmia before the onset of ischemic stroke were excluded from our study. These patients were assessed for different morbidities such as; UTI, shoulder pain, arrhythmia, pneumonia, and hyponatremia after undergoing baseline investigations like urine tests, blood tests, and ECG. Data was entered and analyzed by the computer program SPSS-22. Frequencies and percentages were calculated for categorical variables like UTI, shoulder pain, diabetes, residential status, arrhythmia, pneumonia, hyponatremia, age groups, history of hypertension, family history of stroke, smoking, gender, and previous history of strokes. Effect modifiers like age, gender, hypertension, educational level, residential status, family history of stroke, diabetes, disease duration, Obesity, smoking, alcohol consumption, and previous history of strokes were controlled by stratification of chi-square test at 95 % CI.

Results

Among these patients, 55.8% were male patients versus 44.2% were females having mean ages to be 50.68± 7.18 years. Diabetes was noted in 23.8 % hypertension was noted in 65.2% and obesity was noted in 29 (16%). The previous history of stroke was 11.6%, the family history of stroke was 20.4%, and 23.8 % were smokers. Serum sodium level was presented as Mean value of 135.89 ± 1.95 mEq/L, urinary tract infection (UTI) was diagnosed in 48.1%, shoulder pain was 39.8%, pneumonia in 23.8%, arrhythmia 32 % and hyponatremia 28.2%.

Table No. 1 Distribution of medical complications among study cases (n= 181)

Morbidities	Yes	No
UTI	87 (48.1%)	94 (51.9%)
Shoulder pain	72 (39.8%)	109 (60.2%)
Pneumonia	43 (23.8%)	138 (76.2%)
Arrhythmia	58 (32%)	123 (68%)
Hyponatremia	51 (28.2%)	130 (71.8%)

Table 2: Cross-tabulation of morbidity pattern of ischemic stroke with regards to age. (n= 181)

Morbidity Pattern		Age (In Years)		Total	P value
		Up to 45	> 45		
UTI	Yes	36	51	87	0.653
	No	43	51	94	
Shoulder pain	Yes	28	44	72	0.358
	No	51	58	109	
Pneumonia	Yes	22	21	43	0.293
	No	57	81	138	
Arrhythmia	Yes	22	36	58	0.336
	No	57	66	123	
Hyponatremia	Yes	22	29	51	0.998
	No	57	73	130	

Table 3: Cross-tabulation of morbidity pattern of ischemic stroke with regards to diabetes. (n= 181)

Morbidity Pattern		Diabetes		Total	P value
		Yes	No		
UTI	Yes	28	59	87	0.014
	No	15	79	94	
Shoulder pain	Yes	36	36	72	0.000
	No	07	102	109	
Pneumonia	Yes	07	36	43	0.222
	No	36	102	138	
Arrhythmia	Yes	14	44	58	1.000
	No	29	94	123	
Hyponatremia	Yes	07	44	51	0.053
	No	36	94	130	

Table 4: Cross-tabulation of morbidity pattern of ischemic stroke with regards to hypertension. (n= 181)

Morbidity Pattern		Hypertension		Total	P value
		Yes	No		
UTI	Yes	46	41	87	0.001
	No	72	22	94	
Shoulder pain	Yes	47	25	72	0.998
	No	71	38	109	
Pneumonia	Yes	26	17	43	0.468
	No	92	46	138	
Arrhythmia	Yes	42	16	58	0.183
	No	76	47	123	

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Hyponatremia	Yes	24	27	51	0.002
	No	94	36	130	

Table 5: Cross-tabulation of morbidity pattern of ischemic stroke with regards to Obesity. (n= 181)

Morbidity Pattern		Obesity		Total	P value
		Yes	No		
UTI	Yes	21	66	87	0.005
	No	08	86	94	
Shoulder pain	Yes	14	58	72	0.310
	No	15	94	109	
Pneumonia	Yes	08	35	43	0.636
	No	21	117	138	
Arrhythmia	Yes	28	30	58	0.001
	No	01	122	123	
Hyponatremia	Yes	22	29	51	0.000
	No	07	123	130	

Table 6: Cross-tabulation of morbidity pattern of ischemic stroke with regards to smoking. (n= 181)

Morbidity Pattern		Smoking		Total	P value
		Yes	No		
UTI	Yes	07	80	87	0.000
	No	36	58	94	
Shoulder pain	Yes	22	50	72	0.108
	No	21	88	109	
Pneumonia	Yes	14	29	43	0.151
	No	29	109	138	
Arrhythmia	Yes	07	51	58	0.014
	No	36	87	123	
Hyponatremia	Yes	00	51	51	0.000
	No	43	87	130	

Table 7: Cross-tabulation of morbidity pattern of ischemic stroke with regards to previous history of stroke. (n= 181)

Morbidity Pattern		Previous History		Total	P value
		Yes	No		
UTI	Yes	14	73	87	0.103
	No	07	78	94	
Shoulder pain	Yes	21	51	72	0.000
	No	00	109	109	
Pneumonia	Yes	00	43	43	0.005
	No	21	117	138	
Arrhythmia	Yes	07	51	58	0.997
	No	14	109	123	
Hyponatremia	Yes	00	51	51	0.001
	No	21	109	130	

Discussion

The morbidity pattern of ischemic stroke encompasses a wide range of neurological and systemic impairments that greatly impact functional abilities and quality of life. Common neurological deficits include hemiparesis, hemiplegia, and sensory disturbances, often resulting in long-term disabilities. Cognitive impairments, such as memory deficits, reduced executive function, and attention difficulties, are frequently observed, particularly in strokes affecting the frontal or parietal lobes. Speech and language challenges, including aphasia or dysarthria, are prevalent in strokes involving the dominant hemisphere. Prolonged immobility increases the risk of secondary complications like deep vein thrombosis, infections (e.g., pneumonia or urinary tract infections), and pressure ulcers. Emotional and psychological effects, such as depression and anxiety, further contribute to the overall morbidity. The severity of these outcomes depends on factors such as the size and location of the stroke, underlying health conditions, and the promptness of medical care and rehabilitation efforts (11).

Of these 181 study cases, 55.8% were male patients while 44.2% were female patients. Male gender predominance has been reported in ischemic stroke in different studies (12-15). Saeed et al (12) reported 61.1 % male gender preponderance in ischemic stroke, similar to our results. Another study reported by Dera Gazi Khan conducted by Javel et al (13) also reported 61 % male gender preponderance. Another study by Farooq et al (14) has reported that 54 % of ischemic stroke patients among males versus 46 % of females. Sico and Associated 15 have reported 58 % male gender predominance, consistent with our study results. Age

influences the morbidity associated with ischemic stroke significantly. Older adults are more likely to experience severe neurological deficits and slower recovery due to diminished neuroplasticity, existing comorbidities, and increased frailty. Cognitive issues, such as memory impairment and reduced executive functions are more common in this age group and can heighten the risk of developing dementia. Secondary complications also vary with age; older individuals face higher risks of infections, deep vein thrombosis, and cardiovascular events, while younger patients may encounter challenges such as returning to work and reintegrating into active life. Overall, age plays a vital role in shaping the outcomes, rehabilitation needs, and long-term management strategies for ischemic stroke. The mean age was 50.68± 7.18 years in these patients and the majority of our patients i.e. 102 (56.4%) were aged more than 45 years while similar results have been reported in other local studies indicating stroke being more common in patients aged in the 5th decade of their life by Khan et al 16 and Abid et al (17). A Japanese study has demonstrated ischemic stroke was encountered 2.6 years earlier among female patients as compared with male patients, similar to our results.

Diabetes, hypertension, and obesity significantly impact the morbidity of ischemic stroke, often increasing its severity and complicating recovery. Diabetes accelerates vascular damage through chronic hyperglycemia, leading to larger infarct sizes, slower recovery, and a higher risk of post-stroke complications, such as infections and delayed wound healing. Hypertension, a major risk factor for ischemic stroke, contributes to recurrent strokes and worsened outcomes by promoting vascular changes, atherosclerosis, and small-vessel disease, which can intensify cognitive and functional impairments. Obesity further elevates these risks by driving systemic inflammation, insulin resistance, and metabolic syndrome, all of which strain cardiovascular health. Additionally, obesity can hinder rehabilitation efforts due to reduced mobility and a higher prevalence of comorbidities like sleep apnea. Together, these conditions often result in poorer recovery, prolonged disability, and increased healthcare needs, emphasizing the critical importance of managing these risk factors to improve stroke outcomes. Diabetes was noted in 23.8 % while hypertension was noted in 65.2%, obesity was noted in 29 (16%) and 23.8 % were smokers. A study from Iran (19) has reported 24 % diabetes, hypertension 78 %, and smoking in 20 %. Khan et al 16 also reported 36.6 % diabetes and 32% smoking.

Serum sodium level was presented as a Mean value of 135.89 ± 1.95 mEq/L, UTI) was noted at 48.1%, pain in the shoulder was 39.8%, pneumonia was 23.8%, arrhythmia 32 % and hyponatremia was encountered in 28.2%. Civelek et al 9 reported UTI in 48.1 % of patients, shoulder pain in 37 %, arrhythmia in 21 %, and pneumonia in 13.6 % of ischemic stroke patients, similar to our results. Rodrigues et al (10) reported 16 % hyponatremia in patients having an ischemic stroke which complies with our findings.

Conclusion

A high burden of medical complications among ischemic stroke patients was observed with UTI as the most prevalent complication which was followed by pain in the shoulder, arrhythmias, pneumonia, and hyponatremia. Our study results emphasize the need for careful monitoring of stroke patients to avoid these complications which exert extra pressure on healthcare settings and are also associated with significant increases in healthcare-related costs.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-TCMMC-003/23)

Consent for publication
Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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Coordination of collaborative efforts.
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Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, final approval of manuscript.
SHAHID REHMAN (*Medical Officer)*
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