Early Complications of Stroke in Hospitalized Patients in Erbil

Kameran Hassan Ismail[1]   Azad Anwar Hamad[2]*   Rashid Hamid Bibani[2]

Abstract

Background and objective: Medical complications are accepted to be an imperative issue after acute stroke and show potential restrictions to optimal improvement. The purpose of this study was to determine the frequency of acute phase complications after stroke.

Methods: This cross-sectional study was conducted between 1st August -to 31st December 2019. A convenience sample of 203 stroke patients attending Rizgary Teaching Hospital in Erbil, Iraq was taken. Patients were followed-up daily and the complications were recorded.

Results: The mean age ± SD of complicated patients was 65.86 ± 15.34 years, while of uncomplicated patients was 63.0 ± 14.72 years. The results revealed that the most common complication of the stroke patients was pain (45.4%), fever (30.3%) and the least ones were urinary traction infection (0.7%) and deep vein thrombosis (0.7%). The results found that 82.4% of the female stroke patients were complicated, while 66.3% of the males were complicated and there was statistically significant association (P = 0.008) between the development of complications and gender, also the rate of complications among illiterate and primary and secondary school patients were 78.4% and 68.3%, respectively while among university patients was 44.4% and there was statistically significant association (P = 0.041) between the development of complication and the educational level of patients.

Conclusion: The findings of this study suggest that post stroke neuro-medical complications are common as concluded in previous studies with few contrasts. The form of these complications is comparable with other setups.

Keywords: Stroke, Early consequences, Disabilities, Prevention

Introduction

Stroke is a major health problem that affects millions of people all over the world every year. The occurrence of stroke appears to be steady, but the mortality has diminished in last two decades.[1-2] This change has been related with better stroke care (for example stroke unit care)[3] and better quality in prevention of cardiovascular risk factors.[1,2,4] Encountering complications after stroke is linked with increased mortality and length of emergency clinic stay in acute stroke patients.[1] The most common complications are fever, pain, progressing stroke and infections, while other complications such as myocardial infarction, pulmonary embolisms and heart failure may likewise happen.[1,3] Most complications occur in the first week after acute stroke.[3] Mortality and disabilities after acute stroke is linked respectively to the number of complication experienced, particularly progressing stroke, lower respiratory tract infection and infections elsewhere.[5,6] Medical complications are believed to be an important problem after acute stroke and present potential barriers to optimal

[1] Department of Community Medicine, College of Medicine, Hawler Medical University, Erbil, Iraq.
[2] Department of Medicine, College of Medicine, Hawler Medical University, Erbil, Iraq.
Correspondence: azad.anwar@hmu.edu.krd

recovery. Several previous studies have suggested that complications not only are common, with estimates of frequency ranging from 40% to 96% of patients, but also are related to poor outcome. Some of the complications described are potentially preventable or treatable if recognized.[7]

Since there is no relevant published study in Erbil to assess the complication of stroke in Erbil, therefore; the aim of this study was to determine the frequency complications in the acute phase after stroke, and to highlight the commonest complication which can be prevented if we increase the awareness to the doctor and to the paramedical staff which they are involved in the stroke unit and also to aware the relative of patient about the possible complications.

Methods

This cross-sectional was conducted between 1st August and 31st December of 2019. A sample of 203 both ischemic and hemorrhagic stroke patients attending Rizgary Teaching Hospital in Erbil, Iraq was taken. Verbal informed consent obtained from all participants and of those who are unconscious the consent obtained from relative and they were assured that their participations are voluntary. The official permission for carrying out this study was obtained from the directorate of Erbil Teaching Hospital.

A short anonymous questionnaire was used including socio-demographic status (age, sex, level of education and marital status), duration of hospitalization, presence of risk factors e.g., smoking status (individuals who had ever smoked (but did not smoke at the time of the interview) would be defined as ex-smokers, regardless of their age at quitting and length of time since they quit)[12], hypertension and diabetes, development of complication and its onset. Patients were followed daily during admission time and until the day of discharge by researcher themselves and the complication recorded to the same questioner of the patient that has special code in case sheet of hospital and the questioner, for searching the complication each patient send for specific investigation according to complication like brain CT, chest XR, general urine examination, skin examination and temperature checking. Complications recorded were pain, fever, aspiration pneumonia, pressure sore, progressive stroke, Fall, depression, seizure, UTI (urinary tract infection), DVT (deep vein thrombosis).

The data was collected using a questionnaire and entered into computer. Statistical package for social sciences (SPSS, version 22.0) was used for data entry and analysis. Continuous variables described in terms of Mean ± SD and categorical variables in terms of frequencies and percentages and Chi square test was used to detect the association. P value ≤0.05 was considered statistically significant.

Results

The mean age ± SD of the patients was 65.14 ± 15.2 years, the mean onset of complication from day of admission was 2.89 ± 2.29 days and the mean duration of hospitalization of stroke patient was 6.11 ± 4.14 days as shown in Table 1.

Table 1 Means of age, onset of complications and duration of hospitalization

Characteristics of the cases (N=203)	mean ± SD
Age (years)	65.14 ± 15.2
Onset of complication (days)	2.89 ± 2.29
Duration of hospitalization (days)	6.11 ± 4.14

The data in table 2 shows that the mean age ± SD of complicated patients was 65.86 ± 15.34 years, while of uncomplicated patients was 63.0 ± 14.72 years (P = 0.247), and the mean duration of hospitalization of the complicated cases was 7.19 ± 4.24 days while the mean duration of hospitalization of the uncomplicated cases was 2.89 ± 0.93 days (P <0.001).

The results revealed that the most common complication of the stroke patients was pain (45.4%), fever (30.3%) and the least ones were urinary traction infection (0.7%) and deep vein thrombosis (0.7%) as shown in Table 3.

Table 2 Means of age and duration of hospitalization of complicated and uncomplicated cases

Characteristics	Complicated (N=152) mean ± SD	Uncomplicated (N=51) mean ± SD	*P* value
Age (years)	65.86 ± 15.34	63.0 ± 14.72	0.247
Duration of hospitalization (days)	7.19 ± 4.24	2.89 ± 0.93	< 0.001

Table 3 The complications of stroke cases

No.	Complications	Frequency (N=152)	Percentage
1.	Pain	69	45.4
2.	Fever	46	30.3
3.	Aspiration pneumonia	43	28.3
4.	Pressure sore	28	18.4
5.	Progressive stroke	19	12.5
6.	Fall	10	6.6
7.	Depression	10	6.6
8.	Seizure	8	5.3
9.	Urinary tract infection	1	0.7
10.	DVT	1	0.7

The results of this study found that 82.4% of the female stroke patients were complicated, while 66.3% of the males were complicated and there was statistically significant association (P = 0.008) between the development of complications and gender, also the rate of complications among illiterate and primary and secondary school patients were 78.4% and 68.3%, respectively while among university patients was 44.4% and there was statistically significant association (P = 0.041) between the development of complication and the educational level of patients. These findings are shown in Table 4.

Discussion

In this cross-sectional study we gathered the inpatient hospital data on medical and neurologic complications following acute stroke in Rizgary teaching hospital in Erbil. The results suggest that medical and neurological complications are common after stroke.

A prospective longitudinal study, concluded that in spite of decline in the frequency of the medical complications within the first week after stroke from 2003 to 2013 by 36% still the complications are high.[3]

The researcher in this study found the admitted patients with stroke developed various complications including (Pain, fever, aspiration Pneumonia, pressure sore, progressive stroke, fall, depression, seizure, UTI, DVT). These complications occurred in 152 (76%) of the patients. These results are nearly double comparing to a study was done in ten Asian countries which found that only (41.9%) developed complications within the first 2 weeks of stroke.[9] This figure is further decreased to

Table 4 Description of the sample

Characteristics	Complicated (N = 152) No. (%)	Uncomplicated (N = 51) No. (%)	*P* value
Sex			
Male	63 (66.3)	32 (33.7)	0.008
Female	89 (82.4)	19 (17.6)	
Smoking			
Non smoker	99 (76.7)	30 (23.3)	
Ex-smoker	29 (74.4)	10 (15.6)	0.611
Current smoker	24 (68.6)	11 (31.4)	
Educational level			
Illiterate	120 (78.4)	33 (21.6)	
Primary and secondary	28 (68.3)	13 (31.7)	0.041
University	4 (44.4)	5 (55.6)	
Marital status			
Single	4 (50.0)	4 (50.0)	0.098
Married	148 (75.9)	47 (24.1)	
Hypertension			
Yes	112 (77.8)	32 (22.2)	0.137
No	40 (67.8)	19 (32.2)	
Diabetes			
Yes	53 (72.6)	20 (27.4)	0.576
No	99 (76.2)	31 (23.8)	
Heart diseases			
Yes	56 (74.7)	19 (25.3)	0.958
No	96 (75.0)	32 (25.0)	

14.6% in a very recent observational study.[10] The higher rate complications among patients in our study might be due to severity of the disease itself, associated co-morbidities and the hospital facility for the management of emergency conditions due to shortage of appropriate laboratories, equipment's, and medications.

In the current the mean onset of complication from day of admission was 2.89 ± 2.29 days and this was close to the finding from a previous study in western countries which are thought to have the capacity to catch complications which occurs early.[1] The mean of the duration of the hospitalization for complicated cases was longer than uncomplicated cases which was statistically significance (P = 0.001). The result of this study is consistent with a previous study that examined the relationship between duration of hospitalization and medical complications and clinical outcome to see whether medical complications were associated with length of stay among acute stroke patients. They found that In-hospital medical complications in particular pneumonia were associated with longer durations of hospitalization.[1]

In this study, the early complications of stroke were more frequent in female 89 (82.4%) compared to the male patients 63 (66.3%) this finding was statically significance (P = 0.008). This finding is consistent with a statically significance conclusion of another study revealed that the severity of stroke and its disabilities outcome were worse in women and the duration of hospital stay was longer for women.[11]

The most frequent early complications in our study where pain has found in 69 patients (45.4%). Fever was the second common early complications of the inpatients with stroke 46 (30.3). Aspiration pneumonia was also a frequent complication it was 43 (28.3%). These results are not consistent with other studies which found that brain edema (increased intracranial pressure) is more frequent and

detected in about one third of the patients (30.2%) followed by urinary incontinence (28.4%) and aspiration pneumonia (19.8%).[9,12] Some of the included patients in this study with aspiration pneumonia also developed other complications such as pressure sore, seizure and UTI this finding was also concluded in other study they found that pneumonia in particular aspiration pneumonia is closely associated with the development of several non-pneumonia medical complications after acute ischemic stroke.[13] Having the cultural custom to oblige drinking water or milk for critically sick and unconscious patients could add to the degrees of occurring aspiration pneumonia in our setting.

Similar to other study[14] pressure sore was not uncommon complication it was 28 (18.4) but the lower rate seen here comparing with other study might be due to the extra attention and care the patients by the nurses and family members or due to the shorter duration of hospital stay in our setups compared to other western setups.[6]

In our study the most common cause of early neurological complications was progressive stroke 19 (12.5), while in a systematic review found that the most common causes include extension of the infarct into surrounding areas of hypoperfused brain tissue, hematoma expansion of intracerebral hemorrhage, delayed cerebral ischemia associated with subarachnoid hemorrhage, other intracranial complications (eg, progressive cerebral edema, hemorrhagic transformation of ischemic stroke) and toxic-metabolic encephalopathy due to medical complications (e.g., concomitant infection; cardiovascular, pulmonary, and/or renal dysfunction).[15]

The early neurological deteriorations is important and should be taken into consideration as a factor that may influence the outcome in acute ischemic stroke.[16] In a study included 505 patients, with acute stroke, the most common complications were urinary tract infection (8.7%), venous thromboembolism (6.1%),

and pneumonia (4.6%). Seventy-eight (15.4%) patients were readmitted within one month.[17]

All, fall, depression and seizure complications have nearly same frequencies and they are not frequent complications in this study they are around 10 (6.5). This is also concluded in other study that fall rates among hospitalized patients with acute ischemic stroke are low (2.3% only), and found that the occurrence of a fall in the hospitalized inpatient can substantially increase with length of stay.[18]

The predominance of seizure in this study was (5.3%). This result is close to the frequency of seizure experienced after stroke revealed by a systematic review and meta-analysis study of seizures occurring after acute ischemic stroke included 25 studies with 13,573 patients treated by intravenous thrombolysis or mechanical thrombectomy or both.[19]

A population-based study showed that the incidence of seizures in the early period of stroke onset was (3.1%) during the initial 24 hour of stroke onset and 8.4% inside the second 24 hour of stroke onset. [20]

The UTI and DVT were two less common complications in this study they were found in only one patient (0.7%). UTI was a relatively late-occurring complication (>1 days) due to its possible association with catheterization. These findings were, lower than ones reported by a meta-analysis that concluded approximately one-fifth of patients with stroke contracted at least one UTI after acute stroke.[21]

More than half of the patients had at least one or more co-morbidities like hypertension and diabetes mellitus but like other studies past history of hypertension, DM and were correlated to complication development.[6]

Strength and weakness of the study:

The strength of this study incorporate the way that this is the only study done in Erbil city which looked in to the different stroke complications while patients on continuous clinical care; being a prospective study, it avoids the methodological errors of retrospective identification of complications from case data which could be not complete as limitations. The weakness of the study was a hospital-based study rather than population based, subsequently might be exposed to bias. Being a hospital-based study; the findings may not address all stroke patients in Erbil governorate who were not admitted to the Rizgary hospital. Furthermore, the study sample was small hampering the analysis of some complication indicators due to the short enrolment period. The smaller number of patients included in the study might have reduced the statistical power therefore the researcher were not able to control for potential confounders.

Conclusion

The findings of this study indicate that post stroke neuro-medical complications are not rare with few contrasts in comparing with previous studies. The pattern of these complications is nearly parallel with other setup results. According to the current study the neuro-medical complications are common after acute stroke and they are main reasons for mortality or long life disabilities. Early patients care at admission is a significant indicator for decreasing the mortality due to acute stroke. Being aware of the types of common complications and associated risk factors helps the clinical team involved in the care of stroke patients to make preparations and plans for the best possible care and also to take appropriate preventive strategies. Despite lack of stroke units or stroke physicians in Rizgary Teaching Hospital in Erbil, and the scarce resources, the life can be saved with better awareness of complications and development of preventive protocols.

Competing interests

The authors declare that they have no competing interests.

References

1. Ingeman A, Andersen G, Hundborg HH, Svendsen ML, Johnsen SP. In-hospital medical complications, length of stay, and mortality among stroke unit patients. Stroke. 2011; 42:3214–8. DOI: 10.1161/STROKEAHA.110.610881

2. Lee S, Shafe AC, Cowie MR. UK stroke incidence, mortality and cardiovascular risk management 1999-2008: Time-trend analysis from the general practice research database. BMJ Open. 2011; 1:e000269. DOI: 10.1136/bmjopen-2011-000269

3. Bovim MR, Askim T, Lydersen S, Fjaertoft H, Indredavik B. Complications in the first week after stroke: a 10-year comparison. BMC Neurol. 2016; 16:133.DOI: 10.1186/s12883-016-0654-8

4. Goldstein LB, Bushnell CD, Adams RJ, Appel LJ, Braun LT, Chaturvedi S, et al. Guidelines for the primary prevention of stroke: A guideline for healthcare professionals from the american heart association/american stroke association. Stroke 2011; 42 (2):517–84. DOI: 10.1161/STR.0b013e3181fcb238.

5. Hong KS, Saver JL, Kang DW, Bae HJ, Yu KH, Koo J, et al. Years of optimum health lost due to complications after acute ischemic stroke: Disability adjusted life-years analysis. Stroke. 2010; 41:1758–65. https://doi.org/10.1161/STROKEAHA.109.576066

6. Rohweder G, Ellekjaer H, Salvesen O, Naalsund E, Indredavik B. Functional outcome after common poststroke complications occurring in the first 90 days. Stroke. 2015; 46:65–70. DOI: 10.1161/STROKEAHA.114.006667

7. Langhorne P, Ramachandra S. Stroke Unit Trialists' Collaboration. Organised inpatient (stroke unit) care for stroke: network meta-analysis. Cochrane Database Syst Rev. 2020; 4:CD000197. DOI: 10.1002/14651858.CD000197.pub4

8. Marston L, Carpenter JR, Walters KR, Morris RW, Nazareth I, White IR, et al. Smoker, ex-smoker or non-smoker? The validity of routinely recorded smoking status in UK primary care: a cross-sectional study. BMJ Open. 2014; 4(4): e004958. DOI: 10.1136/bmjopen-2014-004958

9. Navarro JC, Bitanga E, Suwanwela N, Chang HM, Ryu SJ, Huang YN, et al. Complication of acute stroke: a study in ten Asian countries Neurol Asia 2008;13:33–9.

10. Park TH, Lee JK, Park MS, Park SS, Hong KS, Ryu WS, et al. Neurologic deterioration in patients with acute ischemic stroke or transient ischemic attack. Neurology. 2020; 95(16):e2178–91. DOI: https://doi.org/10.1212/WNL.0000000000010603

11. Santaluciaa P, Pezzellab FR, Sessa M, Monaco S, Torgano G, Anticoli S, et al. Sex differences in clinical presentation, severity and outcome of stroke: Results from a hospital-based registry. Euro J Intern Med. 2013; 24(2):167–71. DOI: 10.1016/j.ejim.2012.10.004

12. Fekadu G, Chelkeba L, Melaku T, Gamachu B, Gebre M, Bekele F, et al. Management protocols and encountered complications among stroke patients admitted to stroke unit of Jimma university medical center, Southwest Ethiopia: Prospective observational study. Ann Med Surg. 2019; 48:135–43. DOI: 10.1016/j.amsu.2019.11.003

13. Ji R, Wang D, Shen H, Pan Y, Liu G, Wang P, et al. China National Stroke Registry (CNSR) Investigators. Interrelationship among common medical complications after acute stroke: pneumonia plays an important role. Stroke. 2013; 44(12):3436–44. DOI: 10.1161/STROKEAHA.113.001931

14. Amir Y,Halfens RJG, Lohrmann C, Schols J MGA. Pressure ulcer prevalence and quality of care in stroke patients in an Indonesian hospital. J Wound Care. 2013; 22(5):254–60. DOI: 10.12968/jowc.2013.22.5.254

15. Seners P, Turc G, Oppenheim C, Baron JC. Incidence, causes and predictors of neurological deterioration occurring within 24 h following acute ischaemic stroke: a systematic review with pathophysiological implications. J Neurol Neurosurg Psychiatry. 2015; 86:87. DOI: 10.1136/jnnp-2014-308327

16. Park TH, Lee JK, Park MS, Park SS, Hong KS, Ryu WS, et al. Neurologic deterioration in patients with acute ischemic stroke or transient ischemic attack. Neurology. 2020; 95:e2178. DOI: 10.1212/WNL.0000000000010603

17. Shah SV, Corado C, Bergman D, Curran Y, Bernstein RA, Naidech AM, et al. Impact of Poststroke Medical Complications on 30-Day Readmission Rate. J Stroke Cerebrovasc Dis. 2015; 24(9):1969–77. DOI: 10.1016/j.jstrokecerebrovasdis.2015.04.037

18. Cox R, Buckholtz B, Bradas C, Bowden V, Kerber K, McNett MM. Risk Factors for Falls Among Hospitalized Acute Post-Ischemic Stroke Patients. J Neurosci Nurs. 2017; 49:355. DOI: 10.1097/JNN.0000000000000322

19. Lekoubou A, Fox J, Ssentongo P. Incidence and Association of Reperfusion Therapies with Poststroke Seizures: A Systematic Review and Meta-Analysis. Stroke. 2020; 51:2715. DOI: 10.1161/STROKEAHA.119.028899

20. Szaflarski JP, Rackley AY, Kleindorfer DO, Khoury J, Woo D, Miller R, et al. Incidence of seizures in the acute phase of stroke: A population-based study, Epilepsia. 2008; 49(6): 974–81. DOI: 10.1111/j.1528-1167.2007.01513.x

21. Yan T, Liu C, Li Y, Xiao W, Li Y, Wang S. Prevalence and predictive factors of urinary tract infection among patients with stroke: A meta-analysis. Am J Infect Control. 2018; 46:402. DOI: 10.1016/j.ajic.2017.10.001