

Presentation, Management, and Outcomes of Acute Stroke in Palestine

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Background—Stroke is a leading cause of death and disability in the Middle East. Data on the uptake of evidence-based practices are limited in the region. We aimed to examine patterns of stroke presentation, management, and outcomes at public Palestinian hospitals.

Methods and Results—Comprehensive data from all patients with acute stroke admitted to 2 public hospitals in the West Bank of Palestine were prospectively collected. Acute stroke presentation patterns, in-hospital evaluation and management, mortality, and stroke complications were evaluated. Data were available for 150 patients with acute stroke between September 2017 and May 2018. The mean (SD) age was 65 (14) years and 49% were women. Only 25% of patients utilized ambulance services for transportation to the hospital. All patients received head computed tomography scans, although few received other investigations such as magnetic resonance imaging (8%) or carotid Doppler (4%). Most patients with ischemic stroke received antiplatelet therapy (98%), although none received thrombolysis. Only 17% received physical therapy evaluation. In-hospital mortality was 12%, 23% of patients had at least 1 poststroke complication, and the median modified Rankin Score at discharge was 4 (interquartile range, 2–5).

Conclusions—We identified high stroke mortality and discharge disability rates in Palestine. Key evidence-based gaps were highlighted, suggesting opportunities for quality improvement. (*J Am Heart Assoc.* 2018;7:e010778. DOI: 10.1161/JAHA.118.010778)

Key Words: acute care • acute stroke • low- and middle-income countries • managed care • Palestine • stroke delivery

Stroke is one of the leading causes of death and disability worldwide. In the Middle East, data on the burden of stroke and uptake of evidence-based practices are limited. A 2010 systematic review of Middle East stroke studies estimated that stroke prevalence rates ranged from 29.8 per 100 000 people in Saudi Arabia to 57 per 100 000 people in Bahrain.¹

In Palestine, a lower middle-income country (LMIC) in the Middle East, national data from 2014 suggest that 11% of all

deaths in public hospitals were attributable to cerebrovascular disease, making it the second leading cause of death after coronary heart disease.² However, there are no data on clinical presentation, management practices, and outcomes among hospitalized patients with stroke.³ Given this gap in knowledge, we aimed to describe current patterns of stroke presentation, treatments, and outcomes among consecutive patients admitted at 2 public Palestinian hospitals with limited resources.

Methods

Study Design and Settings

Four major healthcare providers exist in Palestine: the Palestinian Ministry of Health, Palestinian nongovernmental organizations, the United Nations Relief and Works Agency, and the private sector. Secondary and tertiary care are mostly provided through the Ministry of Health in 12 hospitals distributed in the North, Center, and South of the West Bank.²

We purposively sampled 2 of the largest Ministry of Health hospitals in the West Bank. Palestine Medical Complex Hospital in Ramallah City is located in the Center and has

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Clinical Perspective

What Is New?

- Gaps exist in Palestinian public hospitals in terms of provision of thrombolytic therapy, stroke unit care, and early rehabilitation.
- These gaps may serve as targets for future quality improvement interventions.

What Are the Clinical Implications?

- Developing an organized stroke unit, introducing acute thrombolysis with intravenous tissue-type plasminogen activator, raising awareness in the community about recognition of stroke symptoms, and early discharge planning in the hospital are 4 areas to focus on to improve acute stroke care in Palestinian public hospitals.

231 beds, serving a population of 338 383 residents. Al-Watani Hospital in Nablus City is located in the North and has 255 beds, serving a population of 372 621 residents.² At the time of data collection, acute stroke was managed by internal medicine specialists and a neurologist at the Palestine Medical Complex Hospital. Al-Watani Hospital did not have a neurology specialist at the time of data collection and acute stroke was managed by internal medicine specialists. Data were collected between September 2017 and May 2018 from Palestine Medical Complex Hospital and between February 2018 and May 2018 from Al-Watani Hospital. The data, analytic methods, and study materials will not be made available to other researchers for purposes of reproducing the results or replicating the procedure. The study was approved by the institutional review board at Birzeit University, Palestine and Northwestern University Feinberg School of Medicine.

Data Collection

We used a standardized tool adapted from the World Health Organization STEPwise approach to stroke surveillance (step 1) of hospitalized cases.⁴ Trained internal medicine residents prospectively registered consecutive patients admitted with an acute stroke (first ever or recurrent), within 24 hours of symptom onset, during the study period. Stroke cases were defined using the World Health Organization criteria: “a focal (or at times global) neurological impairment of sudden onset and lasting more than 24 hours (or leading to death) and of presumed vascular origin.”⁵ Patients were followed until discharge. Transient ischemic attacks were excluded because objective confirmatory tests to identify a transient ischemic attack from other transient neurological symptoms do not exist and because the final diagnosis relies mainly on clinical history

and recollections of the patient who, by definition, was neurologically impaired.⁶ Written informed consent was obtained from all patients or a family member accompanying the patient as appropriate. Results are summarized using frequencies and percentages, means (SD), or medians (interquartile range) using STATA version 10.1 (StataCorp).

Results

Between September 2017 and May 2018, 151 consecutive patients were admitted with an acute stroke. One patient was discharged against medical advice. Results are presented for the remaining 150 patients with stroke.

Stroke Presentation and Risk Factors

A total of 110 patients (73%) were recruited from Palestine Medical Complex located in Ramallah City, and the remaining 40 patients (27%) were recruited from Al-Watani Hospital located in Nablus City. The mean age (SD) was 65 (14) years and 49% were women. Only 25% of patients arrived by emergency medical services and 61% arrived at the hospital within 3 hours of symptom onset, of whom 57% received imaging within 45 minutes of arrival. Most strokes were ischemic (92%). Patients were most commonly admitted to the medical unit (84%), while 13% were admitted to the intensive care unit or the cardiac care unit. The median National Institutes of Health Stroke Scale was 8.5 (4–15). Hypertension was the most common risk factor reported by 67% of patients (Table 1).

In-Hospital Evaluation and Management

In-hospital evaluation and management data are presented in Table 2. All patients received a head computed tomography scan; however, only 8% received magnetic resonance imaging and 4% received carotid Doppler. Most (98%) patients received ECG, and 11% received echocardiography. Among patients diagnosed with ischemic stroke, 92% received antiplatelet therapy and none received thrombolytic therapy. Among patients with atrial fibrillation, 74% received anticoagulation. Few patients received an evaluation for physical therapy (17%), and even fewer (11%) received an evaluation for occupational therapy. Two thirds of patients received venous thromboembolism prophylaxis during the hospital stay, and 25% were prescribed a statin at discharge.

Discharge Outcomes

At discharge, the median modified Rankin Scale score was 4 (interquartile range, 2–5) and 12% of patients died during the hospital stay. Pneumonia was the most common in-hospital

Table 1. Demographic Characteristics and Stroke Presentation

	Ischemic Stroke (n=138)	Hemorrhagic Stroke (n=12)	All Patients (N=150)
Hospital, % (No.)			
Palestine Medical Complex, Ramallah	73 (101)	75 (9)	73 (110)
Al-Watani, Nablus	27 (37)	25 (3)	27 (40)
Mean age (SD), y	65 (14)	70 (9)	65 (14)
Women, % (No.)	48 (66)	58 (7)	49 (73)
Residence, % (No.)			
Urban	36 (50)	8 (1)	34 (51)
Rural	57 (79)	92 (11)	60 (90)
Refugee camp	7 (9)	0	6 (9)
Arrived with EMS, % (No.)	27 (37)	8 (1)	25 (38)
Arrived within 3 h of symptom onset, % (No.)	60 (83)	67 (8)	61 (91)
Received imaging within 45 min of arrival to the hospital, % (No.)*	58 (48)	50 (4)	57 (52)
Admission to, % (No.)			
Intensive or cardiac care unit	10 (14)	42 (5)	13 (19)
Medical unit	87 (120)	50 (6)	84 (126)
Other unit	3 (4)	8 (1)	3 (5)
Able to ambulate independently prestroke, % (No.)	83 (115)	67 (8)	82 (123)
Stroke severity (NIHSS) on admission, % (No.)			
Mild (NIHSS 0–6)	38 (52)	42 (5)	38 (57)
Moderate (NIHSS 7–12)	30 (41)	25 (3)	29 (44)
Severe (NIHSS 13–20)	17 (23)	33 (4)	18 (27)
Very severe (NIHSS ≥21)	16 (22)	0	15 (22)
Median NIHSS (IQR)	8.5 (4–15)	8.5 (4.5–13.5)	8.5 (4–15)
Stroke risk factors, % (No.)			
Hypertension	66 (91)	75 (9)	67 (100)
Diabetes mellitus	46 (63)	75 (9)	48 (72)
Previous stroke	39 (54)	33 (4)	39 (58)
Dyslipidemia	33 (46)	50 (6)	35 (52)
Current smokers	33 (45)	17 (2)	31 (47)
Atrial fibrillation	19 (26)	8 (1)	18 (27)

EMS indicates emergency medical services; IQR, interquartile range; NIHSS, National Institutes of Health Stroke Scale.

*Among patients who arrived at the hospital within 3 hours of symptom onset.

complication (15%), followed by urinary tract infections (8%), myocardial infarctions (3%), and symptomatic hemorrhagic transformation (3%). One percent developed deep vein thrombosis, and another 1% had a recurrent stroke. Overall, 23% had at least 1 complication. The median hospital length of stay was 3 days (interquartile range, 2–5; Table 3).

Discussion

In this prospective hospital-based registry at 2 public hospitals in the West Bank of Palestine, we observed high rates of discharge disability and mortality. We also identified

several gaps in acute stroke management including absence of thrombolytic therapy, low rates of diagnostic vascular and cardiac imaging, suboptimal rates of anticoagulation for atrial fibrillation, and limited rehabilitation services. These data suggest that major opportunities exist for quality improvement interventions in Palestine.

Half of the patients who arrived within 3 hours had computed tomography imaging within 45 minutes of arrival. Yet, thrombolysis was not provided to any patient because of lack of availability. The cost of alteplase has been noted to be a major barrier to thrombolysis in LMICs.⁷ The discrepancy in using thrombolytic therapy by country income group has been

Table 2. In-Hospital Evaluation and Management

	Ischemic Stroke (n=138)	Hemorrhagic Stroke (n=12)	All Patients (N=150)
Head computed tomography scan, % (No.)	100 (138)	100 (12)	100 (150)
Magnetic resonance imaging of the brain, % (No.)	8 (11)	8 (1)	8 (12)
Carotid Doppler, % (No.)	4 (6)	0	4 (6)
ECG, % (No.)	98 (133)	100 (12)	98 (145)
Echocardiogram, % (No.)	11 (8)	0	11 (8)
Acute antiplatelet therapy, % (No.)	98 (136)	17 (2)	92 (138)
Medications received among patients with risk factors, % (No.)			
Antidiabetic	97 (61)	89 (8)	96 (69)
Cholesterol lowering	91 (42)	67 (4)	88 (46)
Anticoagulant	77 (20)	0	74 (20)
Blood pressure lowering	59 (54)	75 (9)	63 (63)
Physical therapy evaluation, % (No.)	18 (25)	8 (1)	17 (26)
Occupational therapy evaluation, % (No.)	12 (16)	0	11 (16)
Venous thromboembolism prophylaxis, % (No.)	81 (112)	17 (2)	76 (114)
Prescribed a statin at discharge, % (No.)	78 (108)	25 (3)	74 (111)

previously described in the literature, with up to 20% of patients with stroke receiving thrombolytic therapy in high-income countries compared with 1% to 3% in LMICs.⁸

In addition to the lack of acute thrombolysis, patients with stroke in Palestine are admitted to medical or other hospital units because organized stroke units are not available. This

likely results in fragmentation of healthcare provision and poorer clinical outcomes.⁹ Clinical practice guidelines for acute stroke have not been implemented in these hospitals, which may partly explain the limited use of anticoagulants for patients with atrial fibrillation, venous thromboembolism prophylaxis, and statin prescriptions at discharge. A

Table 3. In-Hospital Stroke Outcomes

	Ischemic Stroke (n=138)	Hemorrhagic Stroke (n=12)	All Patients (N=150)
Stroke outcomes (mRS) at discharge, % (No.)			
Mild disability (mRS 0–2)	32 (44)	17 (2)	31 (46)
Moderate disability (mRS 3)	19 (14)	25 (3)	15 (22)
Severe disability (mRS 4–5)	41 (57)	58 (7)	43 (64)
Death (mRS 6)	13 (18)	0	12 (18)
Median mRS at discharge (IQR)	4 (1–5)	4 (3–4)	4 (2–5)
Pneumonia, % (No.)	15 (21)	8 (1)	15 (22)
Urinary tract infection, % (No.)	8 (1)	8 (1)	8 (12)
Myocardial infarction, % (No.)	3 (4)	0	3 (4)
Symptomatic hemorrhagic transformation, % (No.)	2 (3)	8 (1)	3 (4)
Deep vein thrombosis, % (No.)	1 (1)	0	1 (1)
Recurrent stroke, % (No.)	1 (2)	0	1 (2)
Pulmonary embolism, % (No.)	0	0	0
Any complication, % (No.)*	24 (33)	8 (1)	23 (34)
Median length of hospital stay (IQR), d	3 (2–5)	5 (4–7)	3 (2–5)

*Complications include pneumonia, urinary tract infections, myocardial infarctions, symptomatic hemorrhagic transformation, deep vein thrombosis, recurrent stroke, and pulmonary embolism. IQR indicates interquartile range; mRS, modified Rankin Scale.

systematic review of 36 studies and 64 246 patients with stroke in LMICs revealed that only 3 of the studies reported the availability of stroke units.¹⁰ Similarly, INTERSTROKE, an international observational study of 12 342 patients with stroke from 28 countries, observed that stroke units were mostly available in high-income countries and less available in LMICs.⁸ Stroke units, evidence-based stroke protocols, and acute thrombolytic treatment have been successfully implemented in Middle Eastern countries, classified as high-income countries.¹¹ Collaborating with these countries and adapting lessons learned to the Palestinian context should be explored as a mechanism to implement stroke units in Palestine.

In-hospital rehabilitation services were also limited in these hospitals. This gap has been reported in studies conducted in LMICs where in-hospital rehabilitation is not available.¹⁰ INTERSTROKE shows that even after discharge, 92% of hospitals in high-income countries have postdischarge rehabilitation services, compared with only 37% in upper middle-income countries and 31% in LMICs.⁸ The ATTEND (Family-led Rehabilitation After Stroke in India) randomized trial evaluated the effect of family-led poststroke rehabilitation in India (n=1250) and demonstrated that family-led rehabilitation was feasible and not inferior to usual care in reducing dependency or death at 6 months.¹²

In addition to hospital-based gaps in stroke evaluation and treatment, we also note opportunities for public education. Three quarters of the patients did not utilize ambulance services to arrive to the hospital. This is a common observation in LMICs that may be attributed to a perception that the patient is not sick enough, slow response of the ambulance services, and high costs.¹³

Raising awareness about recognition of stroke symptoms and the importance of using an ambulance have been effective in LMICs¹⁴ and should be explored in Palestine. The Palestinian Red Crescent Society is the main provider of emergency medical services in Palestine. Palestinian Red Crescent Society emergency services are offered through a hotline and encompass 42 centers distributed across Palestine. These centers are assisted by 140 ambulances and 348 paramedics.¹⁵ Preparedness of these services to manage stroke cases has not been evaluated. The utilization of emergency services and their preparedness to manage stroke cases in Palestine should be explored as a potential area for improvement of stroke care.

Data on the process of acute stroke care are limited in the Middle East with only 1 prior Palestinian study published in 2009.³ Our results provide insight on the management and outcomes of patients with stroke in Palestine a decade later accounting for changes in clinical practice guidelines. These results highlight 4 areas to focus on to improve acute stroke care in these hospitals: (1) develop an organized stroke unit within a geographically defined location in each hospital and identify a multidisciplinary stroke team comprising medical,

nursing, physiotherapy, occupational therapy, speech therapy, and social work staff. Given the limited resources, a stroke unit may comprise a set number of beds within an already established medical unit or intensive care unit; (2) introduce acute thrombolysis with intravenous tissue-type plasminogen activator; (3) raise awareness in the community about recognition of stroke symptoms and the importance of using an ambulance to deliver patients with acute stroke to the hospital; and (4) implement a pathway for early discharge planning in the hospital. Early discharge planning strategies include early assessment of discharge needs, identification of realistic rehabilitation recovery goals, involving the patient and their family in the recovery process, and early rehabilitation at home or in the community.

Study Limitations

Our study has limitations. As a hospital-based study, patients with acute stroke not admitted to the hospital were not captured, possibly biasing our results toward more severe cases. Our sample captured mostly patients with ischemic stroke. Further investigation is required to understand why patients with hemorrhagic stroke are not admitted to these hospitals. Last, given the small sample size, we did not explore predictors of guideline adherence or outcomes.

Conclusions

We describe stroke presentation, management, and outcomes in 2 public hospitals in Palestine. Results indicate poor clinical outcomes at discharge including high mortality rates, severe disability, and high rates of poststroke complications. Although many patients arrive early to the hospital and receive computed tomography imaging, gaps exist in the provision of thrombolytic therapy, stroke unit care, and early rehabilitation. These gaps may serve as targets for future quality improvement interventions.

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