The Outcome of Stroke at Hospital Discharge in New York City Blacks

BY STEPHEN Q. SHAFER, M.D., BERTEL BRUUN, M.D., AND RALPH W. RICHTER, M.D.

Abstract: The Outcome of Stroke at Hospital Discharge in New York City Blacks

- Of 527 black patients admitted with new stroke to a municipal general hospital, 311 (59%) were discharged alive. Thirty-nine percent of survivors were independent with minimal or mild deficit. Thirty-two percent were independent with significant neurological deficit. Twenty-two percent were dependent, of whom half went home with special assistance and half to nursing homes. Five percent were transferred to a long-term rehabilitation hospital. These figures are similar to those from other races and settings. Stroke patients used more than 12,400 hospital days per year, at least 11% of all bed-days on the appropriate services. The average stay was 54 days for survivors, 22 days for fatal cases, and 45 days for all cases. The 28% of survivors who were severely disabled used 51% of all the hospital days, much of that time stable and awaiting transfer to long-term care. Such severely disabled patients comprise much of the growing burden of stroke on a community’s resources. Expanding long-term care facilities for stroke patients is a social and economic necessity.

Introduction

- In the United States, stroke is the third most common cause of death and a common crippling illness. To plan short-term and long-term facilities for a population at risk, two aspects of stroke outcome must be known. The first is the extent of physical and intellectual damage in patients with new stroke; the second is their observed need for hospitalization. These two aspects of stroke outcome were analyzed for 1971 to 1972 for patients in the Harlem Regional Stroke Program. Based at Harlem Hospital, the program is funded by the New York Metropolitan Regional Medical Program and conducted in cooperation with the Columbia University-Harlem Hospital Affiliation and the New York City Health and Hospitals Corporation.

- Harlem, on upper Manhattan Island, is the largest black inner city in the United States. In this locale, fully 98% of the stroke patients are black. Many elderly people live alone in poor housing. That situation gives them little financial or social reserve against a crippling illness, but is not unique to urban blacks.

- Harlem Hospital is a 1,000-bed general municipal hospital. Most stroke patients are cared for on one of four services: medicine (225 beds); neurology (30 beds); rehabilitation medicine (30 beds); and intermediate care (30 beds). Harlem Hospital is not the only hospital used by residents of Harlem; therefore, there is no fixed population from which its patients consistently come. Whether or not a patient is hospitalized at Harlem Hospital depends on such factors as the suddenness and the severity of illness and upon ambulance transport patterns.

- According to Census Bureau sources, the population in 1970 of the 14 Health Areas of Central Harlem from which most patients with sudden serious illnesses come to Harlem Hospital was 233,000. Bruun and Richter1 estimated an age-adjusted incidence rate of at least 212 new cases of stroke per 100,000 population per year for ten core Health Areas surrounding the hospital. We are not sure whether this rate can be extrapolated to the whole area from which the hospital draws its patients, but this would be a reasonable projection.

- Using this incidence rate and the 1970 census base, it is estimated that approximately 500 new strokes occur annually in the 14 Health Areas served mostly by Harlem Hospital. Probably the majority...
OUTCOME OF STROKE AT HOSPITAL DISCHARGE

TABLE 1
Survival and In-Hospital Fatality in 527 Stroke Patients

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived</td>
<td>311</td>
<td>59</td>
</tr>
<tr>
<td>Died</td>
<td>216</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>527</td>
<td>100</td>
</tr>
</tbody>
</table>

are seen at Harlem Hospital, which admits an average of 325 new stroke patients yearly.

Methods
An effort was made to enroll in the Harlem Regional Stroke Program every patient with new stroke in Harlem Hospital since January 1, 1971. It is the policy of the services involved to admit all cases of new stroke seen in the Emergency Room. Most cases, once admitted, were noted by a Nurse Coordinator. She referred all patients whose admitting diagnosis suggested stroke to a Program Neurologist. Other cases were referred directly by House Staff or neurology consultants. Morgue and autopsy records also were searched to identify cases where early death had prevented intake. By these means most patients with stroke hospitalized at Harlem Hospital became known to the Stroke Program. We feel the Program Registry gives a valid sample of all strokes in Harlem.

Patients with subarachnoid hemorrhage from documented ruptured intracranial aneurysm or arteriovenous malformation were not enrolled in the Program. Between January 1, 1971, and November 30, 1972, 546 patients were enrolled. Twelve patients with transient ischemic attacks and seven transferred elsewhere within the first month are excluded from this series. The remaining 527 cases are the base of the present report.

Results
The distribution of outcomes at discharge after new stroke in all patients is shown in tables 1 and 2. Three hundred eleven (59%) of the patients were discharged alive, while 216 (41%) died in the hospital. For survivors, outcome at discharge was divided into five categories developed for this series:

1. **Minimal or mild new deficit**—The most severe new deficit in this category was mild weakness of a still useful extremity. The most common residuum was a minimal deficit (e.g., pronator drift or a tendency to foot drop). Most patients in this category are potentially capable of gainful employment, but we felt that return to previous employment would be a meaningless index. Many were unemployed at the time of their stroke. Others worked in trades (e.g., construction) where the competitive disadvantage of any ill health prevented return.

2. **Moderate to severe disability, independent in activities of daily living (ADL)**—In this category are patients who, for example, are fully ambulatory with a paretic upper extremity. All patients in this category are capable of living independently in their premorbid social setting.

3. **Home, not independent in ADL**—This small category includes severely disabled patients, limited in ambulation to a few assisted steps or less and often intellectually impaired. In each case, however, extra home assistance was required, usually that of a devoted family, or a professional home health worker. The Visiting Nurse Service was often engaged. The Department of Social Service at Harlem Hospital was instrumental in all arrangements in this category.

4. **Long-term rehabilitation hospital**—Harlem Hospital is associated with Bird S. Coler Hospital, where a number of stroke patients were transferred for anticipated rehabilitation-oriented stays of many months. Patients were accepted only if the Coler staff thought they showed physical and intellectual potential for ultimate independence.

5. **Nursing home or chronic-care hospital**—Patients in this category were virtually all dependent on daily nursing attention which could not be arranged outside an inpatient facility.

<table>
<thead>
<tr>
<th>Outcome category</th>
<th>Category definition</th>
<th>Number</th>
<th>% of all survivors</th>
<th>% of all stroke patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minimal or mild deficit</td>
<td>121</td>
<td>39</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>Moderate to severe deficit, independent in activities of daily living (ADL)</td>
<td>102</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>At home, but not independent in ADL</td>
<td>36</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Long-term rehabilitation hospital (Bird S. Coler)</td>
<td>17</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Nursing home or chronic-care hospital</td>
<td>35</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>All categories total</td>
<td></td>
<td>311</td>
<td>99</td>
<td>59</td>
</tr>
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Having a rehabilitation ward as well as physiotherapy and occupational therapy services assured that no patient was discharged until at least independent or at fullest potential.

One hundred twenty-one survivors (39%) were discharged in outcome category 1; 102 (32%) in outcome category 2; 36 (12%) in category 3; 17 (5%) in category 4; and 35 (11%) in category 5.

The length of hospital stay varied with the degree of functional recovery. The mean length of stay was 54 days for survivors in general, 22 days for fatal cases and 45 days for all cases (table 3). For survivors it was 26 days in outcome category 1, 47 days in category 2, 80 days in category 3, and 136 days in category 5 (table 4). The total of stroke patient-days over the 23-month period was 23,798.

The total patient-days were divided as shown in table 5 to provide a minimum annual bed requirement for the care of stroke patients at Harlem Hospital—12,400 bed-days. This figure represents approximately 11% of all bed-days available on the four services concerned with stroke patients—medicine, neurology, rehabilitation and intermediate care. At an average daily charge of $100 per bed, the annual charge of hospitalizing stroke patients at Harlem Hospital is over $1,200,000. This figure does not include professional (except nursing), therapeutic, or technical services for which no accounting is made. Nor does it include re-admissions for subsequent strokes.

**Discussion**

The in-hospital case fatality rate for the present series was 41%. This figure differs by less than 5% from case fatality percentages for whites in five of the seven areas surveyed by Kuller et al. In the present series, 23% of all patients (39% of survivors) returned to lives not much changed physically by their stroke (outcome category 1), while another 19% (32% of survivors) were independent despite significant deficit (category 2). In all, 42% of all stroke patients (71% of survivors) were capable of independent activities of daily living at discharge, although not necessarily completely self-sufficient.

**TABLE 3**

<table>
<thead>
<tr>
<th></th>
<th>Aggregate hospital days</th>
<th>Mean length of stay, days</th>
<th>Median length of stay, days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survivors</td>
<td>17,065</td>
<td>54</td>
<td>34</td>
</tr>
<tr>
<td>Deaths</td>
<td>6,733</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23,798</strong></td>
<td><strong>45</strong></td>
<td>—</td>
</tr>
</tbody>
</table>

Data with which to compare these figures are scarce for two major reasons: first, there is no general agreement on classification of disabilities after stroke; and, second, most of the literature on the subject is from rehabilitation services, which do not see the whole spectrum of stroke outcome.

The distribution of grades of recovery observed in the present series is compared in table 6 to the distribution in four other series. Only one of these series, that of Rankin, was from an acute-care hospital; the other three were from rehabilitation services (Lowenthal et al., Lee et al.) or post-acute care facilities (Hurwitz and Adams). When each author's different but comparable categories are grouped under two subheadings, "good" or "fair" versus "poor," the short-term outcomes are quite alike. Under "good" or "fair" outcome, we would classify 71% of our survivors, 81% of Rankin's, 60% of Hurwitz's and Adams' and 66% of Lee's. Lowenthal's series appears to show a better outcome, but nearly half of those patients were transferred to a rehabilitation hospital, and their discharge outcomes are not reported.

Within the group with "good" outcome, the figure for those with minimal or mild deficit in function varies greatly. Our assignment of 39% of...
survivors to this category agrees exactly with that of Lowenthal et al., but is higher than that (18%) of Rankin and lower than that (50%) estimated by the Joint Committee for Stroke Facilities.7 The disparity among these proportions is probably due more to variations in the patient material, the criteria defining stroke and the definitions of quality of outcome than to variations in stroke severity among populations.

Twenty-eight percent of survivors (16% of all patients) in the present series were severely disabled. One-fifth of this group were transferred with some prospect of useful recovery to an affiliated rehabilitation hospital but were lost to follow-up (category 4). The remaining 14% of patients (22% of survivors) were permanently disabled. These unlucky people pose great individual problems. Moreover, they inappropriately use hospital beds needed for shorter-term illnesses. Patients in outcome categories 3, 4 and 5 comprise 28% of all the survivors, but accounted for 51% of all survivor hospital days. Long waits for over-applied nursing homes greatly prolonged stays.

In a poor and socially chaotic area like an urban ghetto, one might expect that some patients might be consigned to nursing homes who with middle class families or neighborhoods could return home. Considering that, we were surprised how few patients required nursing home care. It also was apparent (table 7) that medical problems were more dominant than sociological ones. The severity of the new motor deficit was the most common factor impelling nursing home placement, with severe dementia the second most common. Most of these patients had severe concurrent illnesses as well.

In addition to annual incidence and mortality, health planners must recognize another index of stroke’s impact on a population—the annual incidence of total or near-total disability it causes. This figure might be estimated from several series as 10% to 15% of the annual incidence of stroke. In Harlem our estimate is 20 to 30 cases per 100,000 per year. As medical care of chronic diseases improves, the need for long-term care facilities for disabled elderly stroke survivors may be expected to rise. Current and projected requirements for post-stroke care must not be overshadowed by vital preventive efforts in any design for the medical needs of a community. Improving chronic care and home help facilities is a humane and economic necessity for the future.

### Table 7

**Major Reason For Placement in Nursing Home or Chronic Hospital After Stroke in 35 Patients**

| Reason                              | Patients
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor deficit</td>
<td>15</td>
</tr>
<tr>
<td>Dementia (pre-existing)</td>
<td>9</td>
</tr>
<tr>
<td>Aphasia/apraxia</td>
<td>5</td>
</tr>
<tr>
<td>Lack of home</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
</tr>
</tbody>
</table>
Acknowledgments

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References


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