

Executive Summary

1. Study background

Stroke is one of major causes of death worldwide and according to the 2011 Korea National Statistical Office data, cerebrovascular diseases was the 2nd leading cause of death in Korea. In addition, stroke requires continued use of medical facilities after disease onset; however, there have been few local studies on the pattern of medical care utilization of stroke patients.

The aim of this study was to analyze the status of medical care utilization of local stroke patients, including the use for each type of medical facilities based on diagnosis and follow-up timing and to identify factors associated with medical care utilization by using the patient survey data and the Health Insurance Review & Assessment Service (HIRA) claims data.

2. Study methodology

(1) Analysis of patient survey data

The 'Patient Survey' data from the year of 2009 were used to investigate general characteristics of stroke patients. The study subjects were defined as patients who used medical facilities among those with disease codes of I60-62 (Cerebral hemorrhage), I63 (Cerebral infarction), I64 (Hemorrhage or infarction, unspecified), and I69 (Sequelae of a cerebrovascular disease) that correspond to the stroke disease in the ICD-10 criteria. As general characteristics, sex, age, medical facility type, inpatient route, context of hospital visit, number of beds, department, length of stay, treatment outcome, discharge type, and medical fee payment method were analyzed.

(2) Analysis of HIRA claims data

To analyze medical care utilization status of incident cases in 2008,

HIRA's health insurance claims data over 5 years (2006~2010) were obtained. The operational definition of new stroke patients in 2008 was developed and medical care utilization pattern over 1 year after stroke onset, demographic characteristics, and total volume of medical care utilization were analyzed in the defined patient group. To take clinical differences into account, subgroup analyses were performed for patients with cerebral infarction and cerebral hemorrhage. In order to define specific characteristics of patients with multiple hospital transfers and long-term stays in hospital, additional analyses were conducted. The total volume of medical care utilization was estimated by the total amount of medical fee (per week, per type of medical facilities) and by the total number of patients who used medical facilities among inpatients and outpatients separately. Medical expenses were itemized for the further analyses. To investigate the increase/decrease of medical expenses by item over time, per-capita, per-week mean medical expenses were calculated for inpatients/outpatients separately. The key patterns of medical utilization were also measured for cerebral infarction and cerebral hemorrhage patients.

3. Study results

(I) Analysis of 'Patient Survey' data

Of all patients, 13,508 patients (2.3%) were hospitalized with a stroke disease code; of these, 2,894 (21.60%) had cerebral hemorrhage, 7,982 (58.97%) had cerebral infarction, 522 (3.86%) were unspecified, and 2,109 patients (15.57%) had sequelae. By sex, the incidence was higher for men and rapidly increased after 40 years old. In case of inpatient facilities, tertiary hospitals indicated the highest proportion of use, followed by hospitals, and nursing hospitals. For the length of stay among inpatients, less than 7 days accounted for the highest proportion of patients, followed by 7~14 days, 15~21 days, and 22~28 days. The number of inpatients decreased gradually over time; however, it started to increase from 1 month after hospitalization. In terms of treatment outcomes for the discharged

patients with stroke, discharge with improvement and complete recovery showed the highest percentage, followed by no improvement, and death. In case of cerebral infarction, improvement and complete recovery made up 46.42%, no improvement was 7.82%, and death was 3.50%. For cerebral hemorrhage, improvement and complete recovery represented 15.17%, death was 2.92%, and no improvement was 2.70%. Three most common types of discharge were leaving hospitals, transferring to another facilities, and voluntary decision of discharge. For inpatients with stroke, the most frequently visited departments were Department of Neurology, Neurological surgery, Rehabilitation, and internal medicine in order.

(2) Analysis of HIRA claims data

According to the operational definition in this study, there were 68,829 patient who claimed with a stroke diagnosis (I60~I64) in 2008. Cerebral infarction patients were approximately 67%, and cerebral hemorrhage patients were 29% of the identified patients. In terms of characteristics at the initial admission, the proportion was the highest in the 70~79 years age group for cerebral infarction patients and in the 50~59 years age group for cerebral hemorrhage patients. Cerebral hemorrhage patients exhibited higher mortality and longer hospitalization period compared to cerebral infarction patients. Approximately 88% of incident cases used advanced general hospitals and general hospitals

For the mean length of hospital stay by the type of medical facilities and type of stroke, a significant difference was noted among advanced general hospitals, general hospitals, and hospitals; admission period was about 10 days shorter for cerebral infarction than for cerebral hemorrhage.

As preliminary analysis to identify the mean length of hospitalization, the mean number of medical facility transfer was analyzed; about 63.7% of patients left hospitals after one time admission, 20.3% and 8.2% patients transferred twice and three times, respectively.

The pattern of medical facility use up to the 3rd hospitalization episodes was estimated for cerebral infarction and cerebral hemorrhage patients;

although both groups mostly used advanced general hospitals and general hospitals for the first admission, the proportion of hospitals and long-term care hospitals became higher for 2nd and 3rd admissions.

In order to take severity of stroke patients into account, subgroup analysis was conducted with groups classified by a mechanical ventilation use. According to the results, the patient group that used mechanical ventilation had a higher mortality, more frequent use of long-term care facilities and less usage of oriental medicine hospitals after the 2nd admission, compared to the group that did not use any ventilation.

Characteristics of inpatients who stayed in one medical facility for 3 months, 6 months and 1 year or longer were analyzed; in case of long-term inpatients at the 1st admission, approximately 60% were cerebral hemorrhage patients, the ventilator use rate was high, advanced general hospitals and general hospitals accounted for a high proportion, and the use rate was particularly high for general hospitals. In case of long-term inpatients at the 2nd admission, approximately 74% were cerebral infarction patients and the ventilator use rate was relatively lower.

Regarding the pattern of medical care utilizations among outpatients, the number of patients increased from 2 weeks after stroke onset but subsequently, slowly declined over time. The disease distribution of outpatients indicated that hypertension was the most common reason for visits.

Based on the total amount of medical costs and the number of inpatients, overall, the total volume of medical care utilization was concentrated on the early phase of treatment course. By the type of medical facilities, advanced general hospitals and general hospitals made up a very high proportion at the beginning of treatments; however, use of hospitals or nursing hospitals increased over time.

For both cerebral infarction and cerebral hemorrhage patients, discharge after admission to a general hospital was the most common pattern. According to the results from per-capita, per-week medical expenses analyses, medical examination fees accounted for a largest part of the

expenses for cerebral infarction patients at the beginning of hospitalization, whereas not only medical examination fees, but also treatment and surgery expenses were high for cerebral hemorrhage patients.

In case of outpatient, fees for medical examination took up the highest proportion for the patients admitted to advanced general hospitals; while cost of rehabilitation treatment represented the highest share in general hospitals, hospitals, nursing hospitals, and clinics.

4. Conclusion

This study has a major implication as it analyzed the pattern of medical care utilization of stroke patients by using the health insurance claims data that involved the general public. Results from this study can be used as the grounds for political decision making in relevant public health areas such as efficient use of medical resources for stroke patients.