Research Article

Traumatic spinal cord injury in West Virginia: Disparities by insurance and discharge disposition from an acute care hospital

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Context: Medicaid has been linked to worse outcomes in a variety of diagnoses such as lung cancer, uterine cancer, and cardiac valve procedures. It has furthermore been linked to the reduced health-related quality of life outcomes after traumatic injuries when compared to other insurance groups. In spinal cord injury (SCI), the care provided in the subacute setting may vary based upon payor status, which may have implications on outcomes and cost of care.

Design: A retrospective review utilizing the institutional trauma databank was performed for all adult patients with spinal cord injury since 2009. Pediatric patients were excluded. Insurance type, race, length of stay, discharge status (alive/dead), discharge disposition, injury severity score (ISS), and hospital charges billed were recorded.

Results: Two hundred patients were identified. Overall 27.5% of patients with SCI during the period of our review were Medicaid beneficiaries. ISS was similar between Medicaid and non-Medicaid patients, but the Medicaid beneficiaries were younger (37 vs 50 years of age; $P < .001$). Medicaid beneficiaries had a significantly longer length of stay (20.9 days; $P < .001$) when compared to all other patients. They furthermore were more likely to be discharged home or to a skilled nursing facility rather than an acute rehabilitation center. Inpatient charges billed for Medicaid beneficiaries were significantly higher than those of non-Medicaid patients (203,264 USD vs 140,114 USD; $P = .015$), likely reflecting the increased length of stay while awaiting appropriate disposition.

Conclusion: Medicaid patients with SCI in West Virginia had a longer hospital stay, higher charges billed, and were more likely to be discharged home or to a skilled nursing facility rather than an acute rehabilitation center, when compared to non-Medicaid patients. The lack of availability of rehabilitation facilities for Medicaid beneficiaries likely explains this difference.

Keywords: Spinal cord injury, Insurance disparities, West Virginia, Rehabilitation, Health outcomes

Introduction

Traumatic spinal cord injury (SCI) is a devastating event for patients, as well as families, communities, and society at large. The prevalence of traumatic spinal cord injury in the United States has been estimated to be as high as 906 per million.[1] In broad terms, there are two treatment phases for traumatic spinal cord injuries, acute and subacute. The acute care phase of a spinal cord injury can be defined as the immediate care given in hospital and may include surgery to minimize damage to the spine. The sub-acute phase refers to when the patient is stabilized and ready to begin the recovery process through rehabilitation. Trauma patients with spinal cord injury (SCI) require lengthy, intense, and specialized rehabilitation therapy in order to achieve maximum recovery. Although hospital care and surgical fixation of such injuries are important, a key factor of outcome is often related to the ability of the patient to obtain adequate rehabilitation following discharge from acute care.

In the United States, health insurance status as well as race and socioeconomic status have been identified as factors linked to inequities in trauma care and outcomes.[2] The United States Census Bureau (2017) reports West Virginians as identity as 93.6% white,

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ranking it among the most racially homogeneous states. However, West Virginia is also characterized by high poverty rates[3] and poor health.[4] A lack of health insurance often leads to poor health outcomes as a result of delayed preventative and diagnostic care, advanced disease and overall higher costs than those who have health insurance.[5]

Approximately 68 million Americans are enrolled in Medicaid.[6] Eligibility for Medicaid can vary by state but in general, Medicaid is publicly funded health insurance for low-income people and people with disabilities. In addition to the numerous socioeconomic challenges experienced as a result of living on a low income, Medicaid recipients can also experience health care disparities related to insurance coverage. For example, researchers have found that patients with Medicaid have worse outcomes for illnesses such as cancer[7–9] and surgical interventions including cardiac valve procedures,[10] and hip replacements.[11] In America, it is reported that 18.9% of people aged 18–64 have Medicaid as a primary payer,[12] but in West Virginia, Medicaid is the primary health insurance provider for about 30% of the total population.[13] Each state sets the provider payment amounts for Medicaid services and in the event of a fiscal downturn, payments are often cut or frozen. The access to care for a patient with Medicaid is likely to be influenced by the payment amount the state reimburses the physician to treat the patient.[14] For example, previous research using the National Ambulatory Medical Care Surveys (NAMCS) data found that 25% of office-based physicians do not accept new Medicaid patients but conversely only 11% will not take a new patient with private insurance.[15] Researchers in Mississippi found that up to half of primary care physicians were not accepting new Medicaid patients.[16] Insurance coverage does not ensure equitable access to medical care especially when private insurance reimburses more generously than Medicaid.[17] Consequently, a decrease in Medicaid physician fees can result in a significant reduction in patient access and continuity of care. For people with SCI, treatment and rehabilitation services required following the acute phase of their injury may vary based upon payor status, which may have implications on outcomes, cost of care, and quality of life for these people. Because the Medicaid system varies widely by US state, the effects of these programs may have regional variation. Such nuances of regional variation likely are not captured in national database-driven research.

According to the Centers for Medicare & Medicaid Services "Inpatient rehabilitation facilities are free standing rehabilitation hospitals and rehabilitation units in acute care hospitals. They provide intensive rehabilitation programs and patients who are admitted must be able to tolerate three hours of intense rehabilitation services per day."[18] The West Virginia Department of Health and Human Resources Bureau for Medical Services indicates that inpatient medical rehabilitation facility admissions is a "non-covered service" for people over 21 years of age.[19] Thus, the intensive rehabilitation needs that people with spinal cord injuries require is not covered by Medicaid in WV. Conversely, one of the largest private health plans in WV, the West Virginia's Public Employee Insurance Agency (PEIA) covers up to 150 days of inpatient rehabilitation per plan year when ordered by a physician.[20] It is the institutional policy at this hospital that health care is available to all, regardless of income or health insurance status and patients are not discharged until they have a safe place to go. Appropriate disposition could include a freestanding rehabilitation facility, a skilled nursing home, or to their own home with proper safeguards in place. This study examines the relationship between Medicaid and non-Medicaid patients in West Virginia and length of stay, charges billed and disposition to specialized rehabilitation centers.

Methods

After institutional review board approval, the institutional trauma databank was queried for all patients admitted with a new traumatic spinal cord injury based upon ICD9 code from 2009 to 2016. Patients under 17 years of age were excluded. Patient demographics, injury mechanism, length of stay, discharge disposition, discharge status, associated injuries, Injury Severity Score (ISS), charges billed, charges collected, and insurance type on discharge were returned. Medicaid beneficiaries were compared to non-Medicaid patients. Additionally, the Medicaid cohort was analyzed for differences between the pre-Medicaid expansion and post-Medicaid expansion groups. Statistical analysis was performed with Graphpad (Graphpad Software 2018), using an unpaired two-tailed *T*-test for numerical variables, and a 2×2 contingency table using Fisher's exact test for categorical variables, with a significance level of .05.

Results

Two hundred patients were found to meet the search criteria. Of the overall group, twenty-four percent (48 patients) were female. Age ranged from 17 to 95, with the mean age being 47 years of age. Additionally, 181 patents identified as white, 2 Asian and 17 were documented as "unknown". Fifty-eight patients (29%) were

Medicaid beneficiaries, while the other patients were classified as "other payor". The distribution of these patients' insurance type can be found in Table 1.

The characteristics of the two populations can be found in Table 2. Length of stay was significantly longer, and cost of care significantly higher, in Medicaid beneficiaries when compared to non-Medicaid patients. Medicaid patients were less likely to be discharged to rehabilitation centers as compared to non-Medicaid patients ($P < .01$). ISS was not significantly different between the two groups, while the Medicaid group was significantly younger than the non-Medicaid group (likely reflecting the age restrictions for Medicare). Mortality was not significantly different between the Medicaid and non-Medicaid groups. When comparing the pre-Medicaid expansion and post-Medicaid expansion groups there was no significant difference in these values.

Discussion

Our findings indicate that SCI patients in West Virginia with Medicaid stay in the hospital over twice as long as non-Medicaid patients at an additional inpatient charge to the state of just over $60,000. This was not significantly altered by the Medicaid expansion in mid-2013. The non-Medicaid patients are twice as likely to be discharged to acute rehab centers after a much shorter hospital stay when compared to non-Medicaid patients. The lack of availability of rehabilitation facilities for Medicaid beneficiaries may explain the difference. The Medicaid patients who are not able to secure an inpatient rehabilitation bed experience an extended hospital stay and are more likely to be discharged directly home, or to a nursing home. Unfortunately, SCI patients who are discharged to a nursing home report significantly lower quality of life compared to matched community dwellers[21] and residents with SCI can consider this environment oppressive and an affront to social dignity.[22] Although an important patient-reported outcome is to return to living at home, quality of life is best improved by maximizing function and independence through treatment at specialized rehabilitation centers.[23] Furthermore, The World Health Organization states that in order to improve outcomes for people with SCI it is essential that treatment includes access to skilled rehabilitation in order to maximize function and independence.[24] Patients such as those covered by Medicaid, who receive their rehabilitation services in an acute care hospital rather than in a specialized facility may not receive the intense, specialized treatment essential for maximum recovery.

The average age for a traumatic SCI injury is 42 years of age.[25] Our sample had an average age of 45 and the Medicaid recipients were on average 13 years younger than non-Medicaid patients. The experience of a less than optimal rehabilitation period for these younger Medicaid patients could have a negative impact on work potential and quality of life for many years. The patients were over 90% white, and only 1% identified as another race. Therefore we did not include race in our analysis although previous research indicates it could be an influencing factor.

In May 2013, as a result of the Affordable Care Act (ACA), it was announced that West Virginia would expand Medicaid to include residents at or below 138% of the federal poverty level. The West Virginia Bureau for Medical Services reports that an additional 143,463 people receive Medicaid services because of this expansion.[26] In this study, 29% of the participants were Medicaid recipients, and no difference between Medicaid and non-Medicaid patients was noted pre and post expansion in regards to injury severity and mortality. This is most likely due to the traumatic nature of SCI in that it is not related to preventative care or insurance status at the time of injury.

Limitations Although drawing data from a single hospital data bank was informative for the purpose of this study, the findings should be interpreted with caution. The statistical methods did not control for patient characteristics such as age or severity of injury.

Table 1. Payor distribution.

Payor	Number of patients	% of patients
Medicaid	58	29
Automotive	12	6
Commercial	54	27
Medicare	44	22
Workman's compensation	15	7.5
Self-pay	6	3
Other state	11	5.5

Note: $N = 200$.

Table 2. Characteristics of Medicaid and non-Medicaid patients.

Characteristic	Medicaid	Non-Medicaid	P value
Mean age	37	50	<.01
ISS	22	23	.75
Mortality	3 of 58	14 of 142	.4
Length of stay	20.9 days	9.6 days	<.01
Charges billed	$203,264	$140,114	.02
Disposition to rehab. center	15 of 58	69 of 142	<.01

Long-term outcomes for people with SCI related to insurance coverage remain to be seen but it has been suggested that those with Medicaid coverage receive suboptimum care and less access to resources as compared to patients with private insurance. This information is important in order to inform policy to improve SCI rehabilitation programs and ensure health equity. A key nuance of this topic, in general, is regional variation based upon different state Medicaid systems, expansion dates, etc., which may influence outcomes but are not likely to be captured in national database research, which is the most common research methodology to assess payor status. Future health care reform needs to address the existing health care disparities, for all Medicaid recipients, especially those with life altering events such as a SCI and ensure availability and access to acute inpatient rehabilitation facilities is not influenced by insurance coverage.

Conclusion

Results from this study indicate that people on Medicaid with SCI in West Virginia stay in the hospital longer and were more likely to be discharged home or to a skilled nursing facility rather than an acute rehabilitation facility, and as a result, are less apt to receive the essential rehabilitation services they need in order to maximize function and independence. Future studies of factors associated with the increased hospital stay are needed to understand why there is a difference in disposition between private and public health payors. The impact of the longer hospital stay and decreased rehabilitation services for Medicaid patients also needs to be investigated in terms of quality of life, adverse events, and long-term outcomes associated with spinal cord injury. Further understanding of the impact of Medicaid versus non-Medicaid insurance status for patients with SCI will support equitable access to specialized rehabilitation facilities and address the disparity of health insurance coverage for this population in West Virginia.

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