Introduction

In the ever-changing economic climate of health-care, understanding the economic trends of patient care is invaluable for all fields of medicine, including neurosurgery. Analysis of these trends is crucial to recognizing changes in supply and demand of healthcare resources and the costs associated with those changes. Healthcare organizations can benefit from this type of economic information to prepare a plan for future decades by using it to identify potential areas of over or under spending or utilization of certain services and pursue the most efficient investments in their respective areas. A global analysis of neurosurgical economic trends is lacking in the literature. We hope that by extracting data of the most expensive Neurosurgical MS-DRGs from the years recently available, it can open a window for the future of investment in this field. This study examined the neurosurgical procedure data from the National Inpatient Sample (NIS), Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality. We reviewed the MS-DRGs from 2008-2014 in United States. All existing MS-DRGs were ranked by total aggregate charges for the year 2014. The first 10 MS-DRGs in the rank order that pertain to neurosurgery or were chosen to be retrospectively analyzed till 2008. For these 10 MS-DRGs, the HCUPnet tool was used to extract data from 2008-2014 on total number of discharges, the national bill (or aggregate charges, the sum of all charges for all hospital stays in the U.S.), mean patient age, mean length of stay, and number of in-hospital deaths. A Z-test calculator was employed to determine statistical significance between years 2008 and 2014. Any probability values less than 0.05 were considered significant for this study.

Methods

This study examined the neurosurgical procedure data from the National Inpatient Sample (NIS), Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality. We reviewed the MS-DRGs from 2008-2014 in United States. All existing MS-DRGs were ranked by total aggregate charges for the year 2014. The first 10 MS-DRGs in the rank order that pertain to neurosurgery or were chosen to be retrospectively analyzed till 2008. For these 10 MS-DRGs, the HCUPnet tool was used to extract data from 2008-2014 on total number of discharges, the national bill (or aggregate charges, the sum of all charges for all hospital stays in the U.S.), mean patient age, mean length of stay, and number of in-hospital deaths. A Z-test calculator was employed to determine statistical significance between years 2008 and 2014. Any probability values less than 0.05 were considered significant for this study.

Results

1. In 2014, NIS reported the neurosurgical MS-DRG with the highest national bill of $22,894,340,928 was “Spinal Fusion Except Cervical without MCC,” which also had the largest rise over the cohort period, increasing from $15,853,679,222 in 2008 (p<0.001).
2. It was also the MS-DRG with the highest incidence, totaling 1,443,112 discharges over the cohort, increasing from 190,692 in 2008 to 214,100 in 2014 (p<0.10).
3. “Craniotomy with major Device Implant/Acute Complex CNS Procedure w/ MCC or Chemo Implant” had the longest length of stay (LOS) with a mean patient stay of 12.9 days over the cohort.
4. This MS-DRG also had the oldest patient population mean age of 57.5 years old. “Craniotomy & Endovascular Intracranial Procedures with MCC” had the highest number of in-hospital deaths totaling 28,707 over the cohort, that increased significantly from 3602 in 2008 to 4410 in 2014 (p<0.05).

Discussion

The findings of this study give a broad look over time at the rapidly changing field of neurosurgery.

- "Spinal fusion except cervical without MCC," had the highest national bill in the USA over the period of the cohort, and is increasing at a significant pace.
- In general, patient populations undergoing the neurosurgical procedures studied are becoming older with time
- Several of the procedures have improved outcomes in terms of shortening LOS and minimizing the number of in-hospital deaths.
- Healthcare organizations can benefit from awareness of this economic information by using it to establish the most efficient healthcare investments in future workforce and research needs and preparing a healthcare roadmap for the following decades.