Hospitalization of patients with myelomeningocele in the 21st century

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Myelomeningocele is a neural tube defect affecting many systems in the human body and requiring multidisciplinary medical care to ensure optimal function and quality of life as well as survival of the patient. In the early 1950s survival of children born with this defect was only about 10%. Since that time advances in pediatric care have led to many patients surviving into adulthood. These patients' medical needs are best served by high-volume medical centers, according to a new article by Dr. Joseph Piatt Jr., published online today in the *Journal of Neurosurgery: Spine*.

Background

Myelomeningocele is the most common and severe form of spina bifida, a neural tube defect in which the spinal vertebrae fail to develop normally during the first few weeks of gestation. In the normal spine, vertebrae encircle the spinal canal, a passageway from the base of the skull to the sacrum. The spinal canal is lined by membranes, known as meninges, which contain the spinal cord surrounded by cerebrospinal fluid (CSF). In cases of myelomeningocele, some vertebrae are malformed, leaving a gap in the bones that allows a portion of the cord, CSF, and meninges to bulge outward and form a pouch beyond the infant's skin. This pouch provides little protection for the spinal cord and nerves.

Damage to the cord and nerves can occur before birth as well as

afterward, and can result in sensory or motor nerve deficits as well as loss of bladder or bowel control. Despite prenatal or postnatal surgery to repair the defect, patients may face complications of the disorder for the rest of their lives.

A frequent consequence of myelomeningocele is hydrocephalus, a buildup of CSF in the brain. Hydrocephalus can cause debilitating symptoms, such as intellectual and motor disabilities, and if left untreated can even lead to death. The condition is usually treated by placement of a shunt to divert excess CSF from the brain to other parts of the body, where it is subsequently reabsorbed by the body. Hydrocephalus occurs in up to 90% of patients with myelomeningocele.

The Study

In his paper, "Adults with myelomeningocele and other forms of spinal dysraphism: hospital care in the US since the turn of the millennium" (*Journal of Neurosurgery: Spine*), Dr. Joseph H. Piatt Jr. states that the natural history and management of myelomeningocele in children is well known but not so in adults. This is unfortunate because patients with this disorder can face diverse health problems throughout their lives, and there are now more adults than children with myelomeningocele. In this paper Dr. Piatt sets out to lessen this knowledge gap.

The author collected data on hospital care in adult patients (18 years and over) with myelomeningocele and concomitant active or inactive/compensated hydrocephalus during the years 2001, 2004, 2007, and 2010. This information was obtained from the Nationwide Inpatient Sample database, which contains a sample of data from 20% of patients discharged from acute-care hospitals in the US. For use in a comparison, the author also collected the same information on patients with other forms of spina bifida (lipomyelomeningocele, filum lipoma and other spinal lipomas, diastematomyelia, and myelomeningocele without

hydrocephalus). In the sample examined, there were 4,657 admissions of patients with myelomeningocele and hydrocephalus and 12,369 admissions of patients with other forms of spina bifida.

Among patients with myelomeningocele and hydrocephalus, the ten most common reasons for hospital admission (in order of occurrence) included urinary tract infections; complications of a device (such as a shunt), implant, or graft; nervous system congenital anomalies; chronic skin ulcers; septicemia; skin and subcutaneous tissue infections; complications of surgical or medical care; infective arthritis and osteomyelitis; spondylosis and other spine disorders; and pneumonia.

The author found that patients with myelomeningocele and hydrocephalus tend to be significantly younger than patients with other forms of spina bifida (means 38 vs. 43 years), and there was a significantly greater proportion of women (62% vs. 56%). Fewer patients older than 40 years of age were in the focus group (28% vs. 47%), but there was an increase in the number of patients with myelomeningocele and hydrocephalus in the "over 40" age bracket in later years.

Hospital admissions for patients with all forms of spina bifida steadily increased over the time period under study. Even after adjustments for inflation, total hospital charges and charges per admission increased in both groups, although total charges per admission tended to be greater for patients with myelomeningocele and concomitant hydrocephalus. With respect to neurosurgical procedures, admissions for hydrocephalus surgery were substantially more numerous in this group, and overall management of hydrocephalus was more successful when performed at high-volume hospitals. Admissions for spinal surgery to correct degenerative spine disorders were more common in both groups than in the general population.

The data support regionalization of hydrocephalus surgery at high-volume hospitals for patients in both groups. Because myelomeningocele affects several systems in the body, Dr. Piatt states that a multidisciplinary team of specialists is necessary to prevent, monitor, and treat potential complications in this patient group. He encourages his colleagues in neurosurgery to support such multidisciplinary programs.

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