Spina bifida in surgically treated infants in Sarajevo region of Bosnia and Herzegovina

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Abstract

Introduction: Spina bifida is a congenital anomaly characterized by incomplitnes of vertebral arches in the medial line which occurs in 3rd and 4th month of intrauterine life. It is often associated with other congenital malformations, but hydrocephalus and Chiary II malformation are the most frequent. Aim: The aim of this work was to obtain the frequency of surgical cases of spina bifida treated at the Clinic for Neurosurgery, Clinical Center University of Sarajevo, Bosnia and Herzegovina.

Methods: Retrospective study was carried out on the basis of the clinical records during the period January 2005. to December 2008. Standard methods of descriptive statistics were performed for the data analysis.

Results: A total of 31spina bifida cases were surgically treated in the period from 2005. through 2008. Out of that number 14 (48.2%) were female patients, while 17 (54.8%) were male patients; sex ratio – 1.21:1. The most common type of spina bifida was myelomeningocele, treated in 24 surgical patients (77.45%), and the most common location was thoracolumbal part of the vertebral column, treated in 13 patients (41.91%).

Conclusion: Anomalies associated with spina bifida were present in 19 patients (61.3%). Hydrocephalus, in 18 patients (58.05%) and Chiary II malformation, in 5 cases (16.13%) were the most frequent anomalies associated with spina bifida.

Keywords: spina bifida, frequency

Introduction

Due to the complexity of its embryological development, congenital anomalies of the central nervous system are one of the most common birth defects. Neural tube defects are a group of severe birth defects in which the brain and spinal cord are malformed and lack the protective encasement of soft tissue and bone and account for the most of the central nervous system congenital anomalies. They are called neural tube defects because they develop out of a tube formed in the early embryo by the closure of the outer germ layer of tissue. This tube later develops into the brain and spinal cord. Normally, the neural tube closure occurs between the 3rd and 4th week of human embryonic development. When the neural tube fails to close properly, a neural tube defect will occur. It is interesting that the prevalence of these anomalies shows considerable geographical variation (1) and female predominance (2, 3, 4). Among the most common tube defects are anencephaly, encephalocele, and spina bifida. Spina bifida is a congenital defect that accounts for about two-thirds of all neural tube defects. Spina bifida (Latin: "split spine") is a developmental birth defect involving the neural tube: incomplete closure of the embryonic neural tube results in malformed vertebrae that do not fully enclose the spinal cord. Spina bifida is one of the most common birth defects, with an average worldwide incidence of 1-2 cases per 1000 births, but certain populations have a significantly greater risk (4). Spina bifida ranges from clinically significant types to minor anomalies that are clinically unimportant. Spina bifida malformations fall into three categories: spina bifida occulta, spina bifida cystica (myelomeningocele), and meningocele. The most common location of the malformations is the lumbar and sacral areas

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of the spinal cord. Spina bifida occulta (occulta is Latin for "hidden") occurs in L5 or S1 vertebrae in about ten per cent of otherwise normal people (5). In spina bifida occulta there is no opening of the back, but the outer part of some of the vertebrae are not completely closed. The split in the vertebrae is so small that the spinal cord does not protrude. The skin at the site of the lesion may be normal, or it may have some hair growing from it; there may be a dimple in the skin, or a birthmark (6). Severe types of spina bifida, involving protrusion of the meninges and/or spinal cord through the defect in the vertebral arch, are often referred to collectively as spina bifida cystica because of the cystlike sac that is associated with these anomalies. Spina bifida cystica occurs about once in every 1000 births. When the sac contains meninges and cerebrospinal fluid, the condition is called spina bifida with meningocele. In the most serious form, the sac or cyst not only contains meningeal membranes tissue and cerebrospinal fluid but also nerves and part of the spinal cord. The spinal cord is damaged or not properly developed. The malformation is called spina bifida with meningomyelocele. Meningoceles and meningomyeloceles may occur anywhere along the vertebral column, but they are most common in the lumbar region (7). About 80-90 % of fetuses or newborn infants with spina bifida - often associated with meningocele or myelomeningocele - develop hydrocephalus. Arnold-Chiari malformation occurs about once in every 1000 births and is frequently associated with both spina bifida and hydrocephalus (1, 5). In our previous study we found that spina bifida is the most common of the CNS congenital anomalies among cases hospitalized in a Department of Neurosurgery, Clinical Center University of Sarajevo, Bosnia and Herzegovina (8). The aim of this work was to obtain the frequency of spina bifida types among cases hospitalized in a Department of Neurosurgery, Clinical Center University of Sarajevo, Bosnia and Herzegovina, during the period January 2005. to December 2008.

Methods

Patients

Retrospective study was carried out on the basis of the clinical records in a Department of Neurosurgery of Clinical Center University of Sarajevo, Bosnia and Herzegovina. From 1st January 2005 to 31st December 2008, a total of 2848 patients were hospitalized and out of that number 31 cases (1.12%) were diagnosed as having some type of spina bifida.

Statistical analysis

Standard methods of descriptive statistics were performed for the data analysis.

Results

A total of 31cases were treated in the Department of Neurosurgery of Clinical Center of Sarajevo during the period from January 2005 to December 2008. Table 1. shows the number of treated spina bifida cases in the observed period. Surgically treated cases of spina bifida were from the whole Federation of Bosnia and Herzegovina and their geographical distribution is shown in Table 2. The structure of patients with spina bifida treated according to the gender is shown in Table 3. Out

TABLE 1. Frequency of treated spina bifida cases from January 2005 to December 2008

Year	Nº
2005	14
2006	5
2007	6
2008	6
	∑ = 31

TABLE 2. Frequency of spina bifida in the observed geographical region

Canton	Nº
Una-Sana	13
Sarajevo	7
Central Bosnia	7
Zenica-Doboj	2
Herzegovina-Neretva	2
	∑ = 31

TABLE 3. Total number and gender of treated spina bifida cases

GENDER	Nº	%
MALE	17	54.8
FEMALE	14	45.2
TOTAL	31	100

of that number 17 (54.8%) were male, while 14 (45.2%) were female patients; sex ratio – 1.21:1. Different types of surgically treated spina bifida cases were myelomeningocele (78%), meningocele (19%) and spina bifida occulta (3%) (Figure 1).

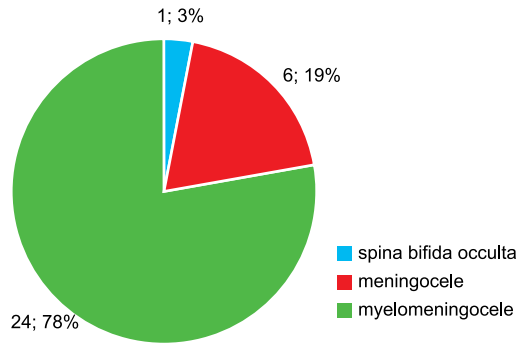

FIGURE 1. Frequency of particular types of spina bifida

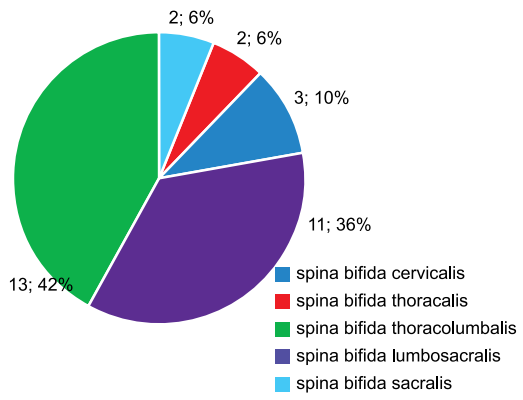

FIGURE 2. Frequency of particular localizations of spina bifida

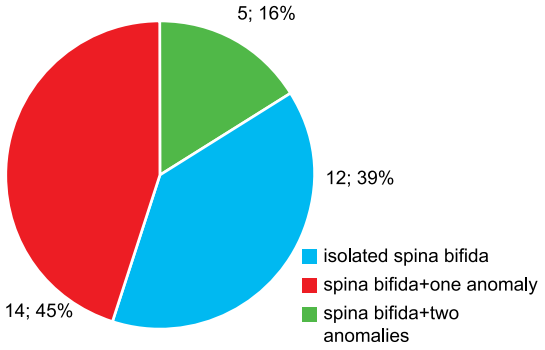

FIGURE 3. Frequency of spina bifida with associated anomalies

The most frequent localizations of spina bifida were spina bifida thoracolumbalis (42%) and spina bifida lumbosacralis (36%) (Figure 2). Isolated spina bifida occurs in twelve cases, multiple malformations were found in nineteen cases (61.3 %), fourteen with one and five with two associated malformations (Figure 3). Hydrocephalus, in 18 patients (58.05 %) and Chiary II malformation, in 5 cases (16.13 %) were the most frequent anomalies associated with spina bifida

Discussion

In the period from 1 January 2005 to 31 December 2008 a total of 31 cases of spina bifida were registered and that 17 (54.8%) were male, while 14 (45.2%) were female patients; sex ratio – 1.21:1. The most frequent type of surgically treated spina bifida was myelomeningocele (77.45 %) and the most frequent localizations of spina bifida were spina bifida thoracolumbalis (41.91 %) and spina bifida lumbosacralis (35.49%). These findings correspond with literature ones (8, 9). Anomalies associated with spina bifida were present in 19 patients (61.3 %). Hydrocephalus, in 18 patients (58.05%) and Chiary II malformation, in 5 cases (16.13 %) were the most frequent anomalies associated with spina bifida. These findings correspond with literature ones (9, 10). It was found that the most of the patients (13, 41.94%) were from the Una-Sana Canton, which is probably associated with a deficiency of folic acid. Prevention of birth defects is one of the greatest national interests and prevention of spina bifida through dietary folate supplements and prenatal counseling is now widespread. In our country must be given more attention to the prevention programs and activities. There is a need to consider an intensive approach to periconceptional folic acid supplementation, genetic counseling and to the establishment of country congenital anomaly registries. The establishment of congenital anomaly registries has taken place for the purpose of the surveillance of the birth defects in a view of their growing contribution in infant morbidity and mortality structure. However, despite several attempts (8, 9, 11), up to now, in our country, no State Register for Congenital Malformations or the Referral Centre of the Ministry of Health for Surveillance of Birth Defects have been established.

Conclusion

According to this investigation, the number of surgically treated spina bifida decreased for about 55% from from 1 January 2005 to 31 December 2008 and it was slightly higher in males (54.8 %). The most frequent type of surgically treated spina bifida was myelomeningocele (77.45 %) and the most frequent localizations of spina bifida were spina bifida thoracolumbalis (41.91 %) and spina bifida lumbosacralis (35.49 %). The most of the patients (13, 41.94 %) were from the Una-Sana Canton. The most frequent anomalies associated with spina bifida were hydrocephalus, in 18 patients (58.05 %) and Chiary II malformation, in 5 cases (16.13 %). Prevention of birth defects is one of the greatest national interests and it is necessary to establish Bosnia and Herzegovina Register for Congenital Malformations.

Competing interests

The authors declare that we have no financial and personal relationships with other people or organizations that could inappropriately influence this work.

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