



International Journal of Pharmacology and Clinical Research (IJPCR)

IJPCR | Volume 4 | Issue 1 | Jan - Jun- 2020
www.ijpcr.net

Review article

Clinical research

ISSN: 2521-2206

A review on spina bifida

Tauhidur Rahaman Mondal¹, N.Sriram¹, Prof.Ebenezer David²

¹Holy Mary Institute of Technology & Science (HITS), College of Pharmacy, Keesara, Hyderabad, 501301

²Department of Pharmacology, National College of Pharmacy, Calicut, Kerala.

*Address for correspondence: Tauhidur Rahaman Mondal

E-mail: trm.tauhid@gmail.com

ABSTRACT

Spina bifida is common birth defect that happened in the area of baby backbone (Spinal Cord) does not form normally. The term Spina Bifida comes from Latin word that literally mean "Split Spina". In this condition where the bones in the vertebral column do not fully cover the spinal cord and leaving it exposed. Spina Bifida falls under the broader category of Neural Tube Defects. Generally, the neural tube forms early in pregnancy, and it closes by the 28th day after Conception. In babies with spina bifida, a portion of the neural tube fails to develop or close properly, causing defects in the spinal cord and in the bones of the spine. Normally lower back is the most common location, but in rare cases it may be the neck or middle back. One child having with the condition, there is 4% chance that the next child will also be affected. There are three main types of spina bifida: Spina Bifida Occulta, Myelomeningocele, and Meningocele. In these types of Spina Bifida, Myelomeningocele is the most serious type and a sac of fluid comes through an opening in the baby's back. Symptoms and signs of spina bifida differ by type and severity. Symptoms can also vary for each person like Birthmark, hair patch, leaking of urine and leaking of stool, muscle weakness, paralysis etc. Complications of spina bifida are generally seen by poor ability to walk, hydrocephalus and problems with bladder or bowel control. Causes of spina bifida exactly unknown or mystery but Scientists suspect various factors like insufficient intake of folic acid, and also genetic, nutritional and environmental. Prevention of spina bifida is difficult, but folic acid and tests during pregnancy can help. Risks factors of spina bifida refer are folate deficiency, diabetes, obesity, increased body temperature and also some medications like anti-seizure (valproic acid). Diagnosis can be carried out by blood test, ultrasound, and amniocentesis. Depends up on the signs and symptoms treatments of spina bifida are Surgery before birth, cesarean birth, surgery after birth, and treatment for complications.

Keywords: Spina Bifida, Spinal Cord, Neural Tube Defects, Myelomeningocele.

INTRODUCTION

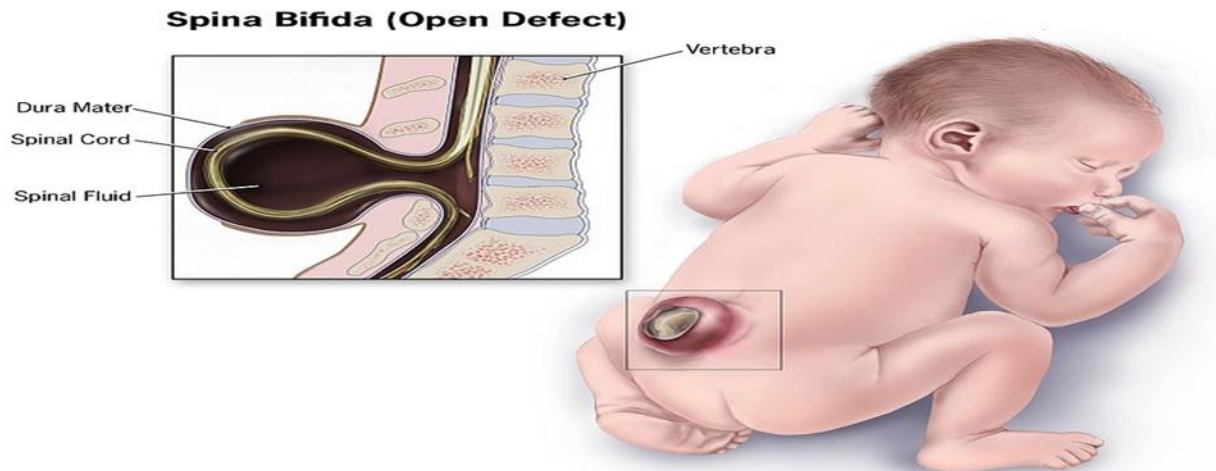
Spina bifida is a birth defect where the bones in the vertebral column do not fully cover the spinal cord, the spine and spinal cord do not form properly and also leaving it exposed. Spina bifida

are mainly classified into three types. Occurring of myelomeningocele (MMC; open spina bifida) in around 1 per 1000 births worldwide. In India Spina Bifida occurs in approximately 5-7 cases per 1000 births. Out of 4 million babies born in the United State each year, spina bifida affects between 1,500

and 2,000 of them. In China each year 80,000 new cases of spina bifida occurs [1].

Definition

Spina bifida is a birth defect that occurs when the spine and spinal cord don't form properly. Spina bifida also called split spine [2].



TYPES OF SPINA BIFIDA [3]

The three most common types of spina bifida are:

1. Spina Bifida Occulta
2. Meningeal
3. Myelomeningocele

Spina bifida occulta

Spina bifida occulta is the mildest type of spina bifida. It is sometimes called "hidden" spina bifida. With it, there is a small gap in the spine, but no opening or sac on the back. The spinal cord and the nerves usually are normal. Many times, spina bifida occulta is not discovered until late childhood or adulthood. This type of spina bifida usually does not cause any disabilities [4].

Meningocele

Another type of spina bifida is meningocele. With meningocele a sac of fluid comes through an opening in the baby's back. But the spinal cord is not in this sac. There is usually little or no nerve damage.

This type of spina bifida can cause minor disabilities [5].

Myelomeningocele

Myelomeningocele is the most serious type of spina bifida. With this condition, a sac of fluid comes through an opening in the baby's back [6-8].

This type of spina bifida causes moderate to severe disabilities, such as problems affecting how the person goes to the bathroom, loss of feeling in the person's legs or feet, and not being able to move the legs [9-11].

SYMPTOMS OF SPINA BIFIDA

The myelomeningocele lesion can occur at any level on the developing spine, but most are found in the lumbo-sacral region. Depending on the lesion's location, myelomeningocele may cause:

- Bladder and bowel problems (incontinence)
- Sexual dysfunction
- Weakness and loss of sensation below the defect
- Inability to move the lower legs (paralysis) and other cognitive impairments
- Orthopaedic malformations such as club feet or problems of the knees or hips and also Spina bifida appearance the main physical manifestations include:
 - Weakness of limbs
 - Paralysis
 - Orthopaedic problems- scoliosis, clubfoot, hip dislocation
 - Urinary incontinence- Kidney dysfunctions, urinary tract infection, lack of bladder control
 - Bowel incontinence
 - Skin irritations and rashes

- Pressure sores (ulcers)
- Abnormal eye movements
- Allergy to latex

CAUSES

The exact causes of Spina Bifida remain a mystery. No one knows what disrupts complete closure of the neural tube, causing this malformation to develop. Scientists suspect the factors that causes Spina Bifida are Multiple; Genetic, nutritional and environmental factors are play a role.

PREVENTION

Since the causes of spina bifida are unknown, it is difficult to prevent it, but folic acid and tests during pregnancy can help.

If you are pregnant or could get pregnant, use the following tips to help prevent your baby from having spina bifida:

- Take 400 micrograms (mcg) of folic acid every day.
- If you have already had a pregnancy affected by spina bifida, you may need to take a higher dose of folic acid before pregnancy and during early pregnancy.
- Talk to your doctor or pharmacist about any prescription and over-the-counter drugs, vitamins, and dietary or herbal supplements you are taking.
- If you have a medical condition—such as diabetes or obesity—be sure it is under control before you become pregnant.
- Avoid overheating your body.

RISK FACTORS

Spina bifida is more common among whites and Hispanics, and females are affected more often than males. Although doctors and researchers don't know for sure why spina bifida occurs, they have identified some risk factors:

Folate deficiency

Folate (vitamin B-9) is important to the healthy development of a baby. Folate is the natural form of vitamin B-9. The synthetic form, found in supplements and fortified foods, is called folic acid.

Some medications

For example, anti-seizure medications, such as valproic acid (Depakene), seem to cause neural tube defects when taken during pregnancy, possibly because they interfere with the body's ability to use folate and folic acid.

Diabetes

Women with diabetes who don't control their blood sugar well have a higher risk of having a baby with spina bifida.

Obesity

Pre-pregnancy obesity is associated with an increased risk of neural tube birth defects, including spina bifida.

Increased body temperature

Some evidence suggests that increased body temperature (hyperthermia) in the early weeks of pregnancy may increase the risk of spina bifida.

PATHOPHYSIOLOGY

Spina bifida occurs at the end of the first month of pregnancy when the two sides of the embryo's spine fail to join together, leaving an open area. In some cases, the spinal cord or other membranes may push through this opening in the back.

ETIOLOGY

The etiology of spina bifida are involved with that's;

- Multifactorial
- Genetics High rate of familial inheritance
- Environment Radiation Chemical Exposure Seasonal/Fungal
- Nutritional status Gestational diabetes Folic acid (Vitamin B12), Vitamin A, cholesterol
- Socioeconomic status.

DIAGNOSIS

Three tests can check for spina bifida and other birth defects while the baby is still in the womb:

Blood test

A sample of the mother's blood is tested to see if it has a certain protein the baby makes called AFP. If the level of AFP is very high, it could mean

the baby has spina bifida or another neural tube defect.

Ultrasound

High-frequency sound waves bounce off tissues in your body to make black-and-white pictures of the baby on a computer monitor. If your baby has spina bifida, you may see an open spine or a sac poking out of the spine.

Amniocentesis

If the blood test shows a high level of AFP but the ultrasound looks normal, your doctor may recommend amniocentesis. This is when your doctor uses a needle to take a small amount of fluid from the amniotic sac around the baby. If there's a high level of AFP in that fluid that means the skin around the baby's sac is missing and AFP has leaked into the amniotic sac.

TREATMENTS

Spina bifida treatment depends on the severity of the condition. Spina bifida occulta often doesn't require treatment at all, but other types of spina bifida do.

Surgery before birth

Nerve function in babies with spina bifida can worsen after birth if it's not treated. Prenatal surgery for spina bifida (fetal surgery) takes place before the 26th week of pregnancy. Surgeons expose a pregnant mother's uterus surgically, open the uterus and repair the baby's spinal cord. Research suggests that children with spina bifida who had fetal surgery may have reduced disability and be less likely to need crutches or other walking devices. In addition, fetal surgery may reduce the risk of hydrocephalus. Ask your doctor whether this procedure may be appropriate for you. Discuss the risks, such as possible premature delivery and other complications, and potential benefits for you and your baby.

REFERENCE

- [1]. Swinyard, C. *The child with spina bifida*. Chicago: Spina Bifida Association of America 1980.
- [2]. Dinnage, R. and Pilling, D. *The child with spina bifida*. Windsor, Berkshire, England: NFER-Nelson 1986.
- [3]. Appelmann, L. *Living with spina bifida*. Victoria, B.C.: Trafford 2002.

Cesarean birth

Many babies with myelomeningocele tend to be in a feet-first (breech) position. If your baby is in this position or if your doctor has detected a large cyst or sac, cesarean birth may be a safer way to deliver your baby.

Surgery after birth

Meningocele involves surgery to put the meninges back in place and close the opening in the vertebrae. Because the spinal cord develops normally in babies with meningeal, these membranes often can be removed by surgery with little or no damage to nerve pathways.

During the procedure, a neurosurgeon places the spinal cord and exposed tissue inside the baby's body and covers them with muscle and skin. Sometimes a shunt to control hydrocephalus in the baby's brain is placed during the operation on the spinal cord.

Treatment for complications

In babies with myelomeningocele, irreparable nerve damage has likely already occurred and ongoing care from a multispecialty team of surgeons, physicians and therapists is usually needed. Babies with myelomeningocele may need more surgery for a variety of complications.

CLINICAL TRIALS

Explore Mayo Clinic studies testing new treatments, interventions and tests as a means to prevent, detect, treat or manage this disease.

CONCLUSIONS

Patient neurological deficit improve in 50% & stabilize in another 40% following surgery. Spina bifida is a multidisciplinary problem. In this condition the planning is necessary and asymptomatic cases should be operated. Surgery for paraplegic patient controversial (We operate after full discussion with family)

- [4]. Hockenberry, M. J., & Winkelstein, w. Wong's essential of pediatric nurshing. philadephia, USA: Elsevier Mosby 7, 2005.
- [5]. Llewellyn, G. and Green, L. *Living with spina bifida*. Lidcombe, N.S.W.: Cumberland College of Health Sciences, The University of Sydney, 1990.
- [6]. Ozek, M. *Spina bifida*. [Place of publication not identified]: Springer2014.
- [7]. Mark R Foster, P. *Spina Bifida Treatment, Causes, Symptoms & Life Expectancy* 2019. [online] eMedicineHealth. Available at: https://www.emedicinehealth.com/spina_bifida/article_em.htm.
- [8]. Mayo Clinic. *Spina bifida - Symptoms and causes*1998. [online] Available at: <https://www.mayoclinic.org/diseases-conditions/spina-bifida/symptoms-causes/syc-20377860>.
- [9]. Ninds.nih.gov. *Spina Bifida Fact Sheet | National Institute of Neurological Disorders and Stroke* 2020. [online] Available at: <https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Spina-Bifida-Fact-Sheet>
- [10]. Centers for Disease Control and Prevention. *Home | Spina Bifida | NCBDDD | CDC*. [online] 2020. Available at: <http://www.cdc.gov/ncbddd/spinabifida/>
- [11]. W. and Center, N. *Spina Bifida (Split Spine): What Is It?*. [online] WebMD2020. Available at: <http://www.webmd.com/parenting/baby/tc/spina-bifida-topic-overview>