The Occurrence of Spina Bifida Occulta in Idiopathic Scoliosis

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ABSTRACT

Objective: To study the occurrence of Spina Bifida Occulta (SBO) in Idiopathic Scoliosis.

Methods: Fifty full spine radiographs of patients diagnosed with Scoliosis were evaluated for SBO.

Results: Evaluation of data was found to be statistically insignificant. SBO was found in only four instances of Scoliosis.

Discussion: A larger study might be better suited to further evaluate any possible link between SBO and Scoliosis.

Conclusion: This study is unable to support a correlation of SBO as a possible factor in the occurrence of Idiopathic Scoliosis.

Keywords: Scoliosis, Spina Bifida Occulta

INTRODUCTION

The purpose of this study was to investigate the possible correlation between Spina Bifida Occulta and Idiopathic Scoliosis and its occurrence among a patient population seen at Logan's Montgomery Health Center.

The incidence of Spina Bifida Occulta in Idiopathic Scoliosis has been noted in previous research to occur so frequently that it is thought to be merely an incidental finding by many radiologists. Since scoliosis is often due to unknown causes, the intent of this study is to determine if the prevalence of Spina Bifida Occulta correlates on x-ray with patients who have Idiopathic Scoliosis.

Spina Bifida Occulta is a congenital defect of the spinal column in which one or more of the vertebrae in the axial skeleton does not form properly causing a failure of normal fusion of the spinal canal. Spina Bifida Occulta is thought to be a less severe form of Spina Bifida Cystica (SBC). The main difference is patients with Spina Bifida Occulta lack any neurological sequelae and is often only discovered when another clinical problem is being investigated. Most patients with Spina Bifida Occulta are completely asymptomatic and completely unaware it is present.

In the United States, it is estimated that patients who have congenital abnormalities of the spine, as many as 50% have Spina Bifida Occulta.

Spina Bifida Occulta can develop at any level of the spine, but prevalence has been shown for the lumbar spine and sacrum, particularly at the level of S1. Research has suggested that a Spina Bifida Occulta at S1 will predispose the patient to an increased risk of posterior disc herniation.

Yochum defines scoliosis as a lateral curvature of the spine that has a Cobb Angle measurement greater than 10 degrees. A normal spine viewed from the posterior would be 0 degrees.

Scoliosis is the most common spinal deformity that affects children today. Mass school screening programs have shown that an estimated 1-3% of school-age children have Scoliosis. Utilizing diagnostic imaging, some curve patterns are easier to see than others are. In nearly all cases however, larger curves are uncommon, but easier to recognize than smaller curves; which are more common. Use of plain film imaging also allows the doctor to make accurate and proper treatment options available to the patient. Diagnosis is typically derived by the correlation of clinical examination findings such as Allen's test and plain film menstruation.

Studies have shown that scoliosis appears in about 2 % of the entire American population. In about .05% of the cases it is serious enough to limit normal physiological function. In the U.S. 85 % of all scoliotic patients diagnosed have the idiopathic or "unknown cause" variety. Idiopathic Scoliosis is thought to occur mainly because of dysfunctional nervous system expression during early embryonic development. The most

common complaint of scoliotic patients is back pain and is generally rated as a 3 out of 10 on the Visual Analog Scale (VAS).

A review of pertinent literature failed to document any recent research that specifically studied any possible correlation between Scoliosis and Spina Bifida. But there were many that would bring into question that Spina Bifida Occulta was more than just an incidental finding. Researchers found during a study investigating Pes Cavus and Scoliosis that out of the 21 patients studied, 16 had Spina Bifida as well. The research concluded that in certain patients with Idiopathic Scoliosis who also had other disorders (such as Pes Cavus); that Spina Bifida Occulta might be a result of an malfunction at some level of the central nervous system.

Cowell and Cowell found that 37% of Scoliosis patients they studied also had Spina Bifida at the level of S1 and that the incidence of SBO in Scoliotic patients decreased with age. Interestingly, the occurrence of posterior disc protrusion increased with age. Another study supported their research when it was found that in patients being treated for posterior disc herniation, a significant number had a Spina Bifida Occulta at S1 as well.

Johnson and Lane concluded that occult spinal dysraphism can be difficult to detect in infants due to their lack of ambulation, as well as, lack of neurological presentation by the dysraphism. They concluded that these findings suggests why Spina Bifida Occulta is often found only incidentally and thus dismissed of any clinical relevancy.

A study completed by the National College of Chiropractic Department of Radiology described the necessity of computed tomography as an adjunct to plain film

investigation of Spina Bifida Occulta. Researchers there recommended it helpful in ruling out a diagnosis of lytic bone lesion that can sometime mimic Spina Bifida Occulta.

These studies are helpful in illustrating the point that Spina Bifida Occulta is more than just an incidental finding. It is an important part in understanding a patient's chief complaint and should be included on the radiologist's written report.

MATERIALS AND METHODS

This study focused on evaluation of fifty randomly chosen full-spine radiographs from Logan College of Chiropractic's Montgomery Health Center and Student Health Clinic records. Inclusion criteria used to select the subjects for this study was based upon the radiologist's impression of a Scoliosis measuring on plain-film radiograph greater than 10 degrees.

Fifty subjects, 12 males and 38 females ranging in age from 13 to 86, were selected using the above criteria. Utilizing Microsoft Excel, notation was made from visual analysis of the radiographs for the spinal region affected by the primary scoliosis, as well as its severity. In addition, was Spina Bifida Occulta also present on the radiograph and if so, at what level of the spine? Further analysis was made to verify that the Spina Bifida Occulta was noted by the radiologist on their written report.

Table 1 **Data Collection Sheet**

Patient ID	Age/Sex	Scoliosis Area/Degree	SBO Present/Level	On Radiology Report
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Table 2 **Data Collection Results**

Patient ID	Age/Sex	Scoliosis	Degrees	SBO	Location	Reported
OPO6405	46/F	T	15	N		
OPO7113	56/M	L	22	N		
OPO7045	70/F	T	31	N		
OPO3708	57/M	TL	26	N		
STOXXXX	26/M	TL	22	N		
STOXXXX	25/M	TL	14	N		
STOXXXX	23/F	TL	15	N		
STOXXXX	18/F	TL	12	N		
STOXXXX	30/M	TL	18	Y	L5	Y
STOXXXX	45/F	TL	15	N		
STOXXXX	22/M	L	24	N		
STOXXXX	20/F	T	23	N		
STOXXXX	30/F	L	27	N		
STOXXXX	18/F	T	18	Y	L5	Y
STOXXXX	18/F	L	12	Y	L5	N
OPO0416	20/F	T	23	N		
STOXXXX	25/F	T	18	N		
STOXXXX	24/M	L	22	N		
STOXXXX	22/F	L	15	N		
STOXXXX	30/F	TL	20	N		
STOXXXX	18/F	L	20	N		
STOXXXX	26/F	T	10	N		
STOXXXX	43/F	T	13	N		
STOXXXX	50/F	TL	20	N		
SFO383	46/F	TL	22	N		
STO4552	28/F	TL	25	N		
OOO7125	27/F	TL	19	N		
OPO4936	52/F	L	18	N		
MCO6580	86/F	L	26	N		
OPO6195	37/F	T	18	N		
OPO6194	15/M	TL	13	N		
PI06662	16/F	TL	41	N		
OPO6900	13/F	L	48	N		
OPO7509	34/F	L	31	N		
CPO4863	19/F	TL	14	N		
CPO7344	31/M	L	13	Y/S1	Y	Y
OPOXXX	25/F	L	31	N		
CPO7116	25/F	L	57	N		
OPO6984	21/M	TL	15	N		
OPO7211	31/F	TL	23	N		
OPO6745	35/F	TL	16	N		
OPO7214	18/F	TL	20	N		
OPO3854	64/M	TL	17	N		
OPO7186	36/M	TL	24	N		
MC2771	70/F	T	10	N		
OPO5098	49/F	T	50	N		
OPO7458	21/F	T	14	N		
OPO6314	14/F	T	21	N		
OPO6952	34/F	TL	19	N		
OPO6760	18/F	L	18	N		

RESULTS

Computer analysis of the raw data using Microsoft Excel proved to be statistically insignificant in supporting any correlation between the occurrence of Spina Bifida

Occulta with Idiopathic Scoliosis following this study. Out of the fifty subject radiographs studied, only four instances of Spina Bifida Occulta occurring simultaneously with Idiopathic Scoliosis was documented. The radiology report neglected to report the presence of Spina Bifida Occulta in only one occurrence.

Table 3 **Location of Major Curves**

CERVICAL	0%
THORACIC	24%
LUMBAR	32%
THORACO-LUMBAR	44%

DISCUSSION

A larger study is recommended to further evaluate the occurrence of Spina Bifida Occulta in Idiopathic Scoliosis. Spina Bifida Occulta is an occurrence that can not be overlooked and additional research is indicated to better understand the complications associated with Spina Bifida Occulta and their effect that can not only structurally as in proper development of the spine but neurologically as well.

The data collected as a result of this small study is extremely useful for epidemiological purposes. The average age of the scoliosis patient in this study was 33 years old. There was prevalence for scoliosis to occur more frequently in females (76%) over the male patients included in the study (23%). The average degree of curvature was 21°. Scoliosis was found to occur most frequently in the thoraco-lumbar junction of the spinal column. Spina Bifida Occulta, when present, was shown to affect the spine primarily at the level of L5/S1. These findings are consistent with earlier epidemiological studies collected and reported in earlier research.

CONCLUSION

Due to the lack of adequate sample size, an accurate determination of the occurrence of Spina Bifida Occulta in Idiopathic Scoliosis cannot be made.

However, the amount of earlier research suggests the need for additional research into Spina Bifida Occulta and Scoliosis. It seems evident that they can cause an increased risk of back pain and or posterior disc herniation.

It is also recommended that a large-scale study be implemented that can better evaluate the possible correlation that exists between these two conditions. Furthermore, additional research is recommended to study and better understand Spina Bifida Occulta as it has the highest percentage of occurrence among congenital deformities of the spine.

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