The prevalence of scoliosis in spina bifida subpopulations: a systematic review

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Context:

Prevalence of scoliosis within spina bifida subpopulations is important for screening/diagnosis and treatment purposes.

Objective:

To determine the prevalence of scoliosis within the spina bifida subpopulations with a systematic review of the literature

Data sources:

Medline-Pubmed, Embase, Cochrane and Pedro.

Study selection:

MESH-terms

Spinal Dysraphism - Neural Tube Defects - Scoliosis

Exclusion criteria

Articles concerning animal studies, case reports, articles that studied the prevalence of spina bifida in patients with scoliosis, inclusion in the study of patients with scoliosis $\leq 10^\circ$ without possibility to identify subgroups with scoliosis $> 10^\circ$, studies without an own study group or the same patient group as another article, articles that studied neural tube defects besides spina bifida and articles that didn't specify the subpopulations of spina bifida that were investigated.

Data extraction:

year(s) in which the study was performed, type of study, sample size, criteria for patient selection, subtypes of spina bifida, mean age, sample size, type of radiographs that were used, cut-off value of scoliosis and prevalence of scoliosis.

A 20° Cobb angle was used as cut-off to create uniform data.

Results:

Two articles concerning diastematomyelia^{1,2} (103 patients: 82 females and 21 males), four about myelomeningocele^{3,4,5,6} (479 patients: 283 females and 196 males) with an overall weighted prevalence of scoliosis (20° Cobb angle cut off) of 44.4% and 52.5% respectively.

Discussion:

Cut-off value

Trivedi et al.⁴ proposed, concerning myelomeningocele, a 20° cut-off as clinically more relevant, since curves $< 20^\circ$ often resolved, Recommendation: mention results for a 10° , 20° and 30° cut-off. This way future studies can be used for both epidemiological and clinical research and comparison with idiopathic scoliosis.

Age

Müller et al.⁷ showed that most progression of scoliosis can be expected before the age of 15.

Recommendation: use a study population with radiograph at age of 15 years or older.

Radiographic measurements

Yazici et al.⁸ found a 29,8% difference in measurement of idiopathic scoliosis in supine and standing position, Recommendation: mention the percentage of supine/standing/sitting radiographs and create subgroups for each position. These subgroups should be compared to see whether or not there are differences in the prevalence, magnitude and curve location of the scoliotic curve.

Conclusion: Most studies have a lot of methodological flaws so there is a need for further research with standardisation of data collection to allow comparison of different data.

We recommend to collect the following data to make the data both clinically and epidemiological useful and to allow comparisons between different studies: gender, classification of spina bifida into subpopulations, radiograph at age of 15 years or older or possibility to identify this group, cut off value for scoliosis of 10° , 20° and 30° Cobb angle, percentage of supine/standing/sitting radiographs with subgroups for each position and ambulatory status.

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3. Müller EB, Nordwall A, E.B. M, Muller EB, Nordwall A. Prevalence of scoliosis in children with myelomeningocele in western Sweden. *Spine (Phila Pa 1976).* 1992;17(9):1097-1102.
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