

PREVALENCE OF SPINA BIFIDA OCCULTA IN MIDDLE AND OLD PEOPLE IN CHINA AND ITS RELATIONSHIP WITH THE OVERACTIVE BLADDER

Hypothesis / aims of study

Spina bifida occulta (SBO) is a subtle form of dysraphism with 1 or more split spinous processes with widened interpedicular distances on plain radiography, which always occurs in lumbosacral vertebrae with or without spinal cord injuries. It is unclear the relationship between SBO and lower urinary tract Symptoms (LUTS) in middle and elderly people. The prevalence of SBO in British is 9.79% (1), while the figure in China has not been reported. The aims of this study is to investigate the prevalence of SBO in the middle-aged and old People in China as well as its relationship to the OAB.

Study design, materials and methods

A cross-sectional and community-based survey was carried out in the residents who ≥ 40 years old in 7 communities (randomly selected) of Zhengzhou, Henan, China. All the cases underwent lumbosacral X-ray, routine urine tests, OGTT and ultrasonography of urinary system to diagnose SBO, urinary tract infection, diabetes mellitus (DM), male benign prostate (BPH) and hyperplasia, respectively. All cases was asked to fill out a questionnaire including basic information history of past and present illness and the OAB symptom score (OABSS). The diagnostic criterion of OAB was established as the urgency score of OABSS ≥ 2 and the total score must be at least 3. Chi-square test was used for data analysis, and $P < 0.05$ was considered to be statistical significant. The diagnosis of SBO was identified by 2 practiced radiologist. The outlook of lumbosacral vertebrae of all subjects was normal by physical exam. The excluded criteria: pregnancy; elderly people with poor communication capacities like dementia, paraplegics etcetera; a disease history of prostate, urethra, or bladder surgery; the diagnosis is discrepancy between the two radiologists.

Results

A total of 1,061 subjects (58.8 ± 11.7 years old) were qualified for the final statistical analysis, consisting of 44.4% male and 55.6% female. Altogether, the prevalence of SBO among the Chinese ≥ 40 years old was 15.1% (160/1,061), significantly higher than that of the British (15.1% vs 9.8%, $P < 0.05$) (1). A total prevalence of SBO in males and female was 18.3% (86/471) and 12.5% (74/590) respectively. The prevalence of SBO is significantly higher in males than females ($P < 0.05$). The subjects were divided into 5 groups: 40-49, 50-59, 60-69, 70-79, ≥ 80 (year-old), and the SBO prevalence of each group was 17.3% (43/249), 13.6% (50/369), 12.6% (29/230), 15.7% (30/191), and 19.0% (8/42), respectively. There was no significant difference of male and/or female SBO prevalence among the different age groups ($P > 0.05$). The most frequent location of SBO were S1, which account for 79.4% (127/160), the percentage of other locations of S2, L5-S1, S1-S2 and L5 were 6.8% (11/160), 6.3% (10/160), 4.4% (7/160) and 3.1% (5/160), respectively.

A total 145 cases with OAB were founded, including 62 males and 83 females, the prevalence was 13.7% altogether, and the number was 13.2% (62/471) for males, 14.1% (83/590) for females, with no significant difference between males and females ($P > 0.05$). The prevalence of OAB increased with age, and the figure was 17.3% (43/249), 13.6% (50/369), 12.6% (29/230), 15.7% (30/191), and 19.1% (8/42) for the 40-49, 50-59, 60-69, 70-79, ≥ 80 (year-old) respectively. A significant difference of OAB was found between 50-59 and 60-69 ($P < 0.05$), as well as 60-69 and 70-79 ($P < 0.05$), while no significant difference between other adjacent groups.

There were 54 cases of OAB related to SBO, the prevalence of OAB among cases with SBO was 33.8% (54/160), significantly higher than the number 10.1% (91/901) for those without SBO ($P < 0.0001$). Among the 145 cases of SBO with OAB, there are no difference of BMI > 30 and DM in cases with SBO comparing to those without SBO, and the prevalence of BPH is significantly lower in SBO than no-SBO ($P < 0.01$), with 45.5% (10/22) vs. 86.8% (33/38).

Interpretation of results

The prevalence of SBO among the Chinese is significantly higher than that of the British, indicating that SBO might be region- and race-dependent. What's more, the prevalence of OAB is significantly higher among males than females, probably due to estrogen which could facilitate the development and fusion of the bone.

Furthermore, SBO might be a novel risk factor for OAB, which is not a normal variation as suggested by other researchers. However, Fidas and colleagues show a significant association between neurophysiological disorders and the presence of SBO and they find that the increased prevalence of spina bifida occulta in men is highly significant (2). Besides, Fukui et al. (a study that describes patients who were originally operated upon during childhood and had been followed into adulthood) display that symptoms of SBO were present in 78.3% of non-operated adult patients, Urinary incontinence was present in 26.1%, voiding difficulty in 26.1%, frequency in 10.9%, urgency in 21.7%, and other complaints in 39.1% (3). An important question is how a congenital condition (SBO) can manifest itself for the first time at an adult age. One hypothesis for this is that at a more subtle degree of tethering, SBO will remain asymptomatic during childhood. Cumulative damage due to repeated microtraumata throughout life can cause adult onset tethered cord syndrome (TSC). Other contributing factors could be age-related changes to the vertebral column, i.e. spinal cord stenosis. Thus, a once asymptomatic, mild tethering can grow into a symptomatic one over the years. So we may deduce that SBO might gradually cause dysfunction of spinal nerves and LUTS (such as OAB) as the time progresses.

Concluding message

The prevalence of SBO is high and the cases with SBO show a potential to suffer from OAB in middle and old people in China.

References

1. Boone D, Parsons D, Lachmann SM, Sherwood T. Spina bifida occulta: lesion or anomaly? Clin Radiol. 1985 ;36(2):159-61.
2. Fidas A, MacDonald HL, Elton RA, McInnes A, Wild SR, Chisholm GD. Prevalence of spina bifida occulta in patients with functional disorders of the lower urinary tract and its relation to urodynamic and neurophysiological measurements. BMJ. 1989;298(6670):357-9.
3. Fukui J, Ohotsuka K, Asagai Y. Improved symptoms and lifestyle more than 20 years after untethering surgery for primary tethered cord syndrome. Neurourol Urodyn 2011; 30: 1333–7.

Disclosures

Funding: supported by Research Foundation from NSFC (No. 81370869), Zhengzhou (No. 131PLJRC657) and Henan No. (201303020) **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Ethics Committee of the First Affiliated Hospital of Zhengzhou University **Helsinki:** Yes **Informed Consent:** Yes