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Structure and complex therapy of dorsalgia in children

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The article presents results of back pain syndrome screening in a population of children according to the poll of 600 students of classes 1–11. The spread of dorsalgiae is 19%. According to the examination, nosological and clinical structure of dorsalgiae was determined in 35 children of 3–18 years of age hospitalized due to back pain. Lumbalgia was revealed in 55 (52%) patients; cervicalgia — in 31 (30%) patients; thoracalgia — in 19 (18%) patients. Juvenile osteochondrosis of lumbosacral spine is the cause of lumbosacral pain syndrome in most patients. The authors analyzed complex treatment efficacy and demonstrated that affective disorders are a prognostically significant factor of back pain onset.

Key words: back pain, vertebrogenic syndromes, spread, etiology, structure, treatment, children.

INTRODUCTION

Backache is an urgent multidisciplinary issue of the modern medicine due to considerable spread of dorsalgiae, high temporary disability level and constantly growing expenses on treatment and rehabilitation of patients. According to the World Health Organization (2003), up to 50% of population in the developed countries suffer from backaches. 70-80% of people experience at least one pain episode throughout life; dorsalgia is persistent in 25-30% of cases. According to various authors, the main causes of backache syndrome in adults are degenerative alterations (intervertebral osteochondrosis, spondylarthrosis deformans, spondylosis), osteoporosis, ankylosing spondylitis, neoplasms and somatic diseases [1, 2]. Different aspects of dorsalgiae in adults have been studied sufficiently well; common diagnostic algorithms, effective methods of complex therapy, orthopedic correction and operative therapy. There have been only a few trials dedicated to the issue of backache in children. At the same time, according to Russian authors, the spread of dorsalgiae of varying localization in children is 19-30%; according to foreign sources – up to 74% [3-6]. Vertebrogenic pain syndrome in children is characterized by clinical and etiological polymorphism and thus complicates resolution of diagnostic problems and selection of differentiated treatment tactics.

Research objective: optimization of medical-diagnostic care rendering to children with vertebrogenic pain syndrome on the basis of its spread, causes, effectiveness evaluation and the age at treatment.

PATIENTS AND METHODS

The research was conducted in several stages in consonance with the objective.

In order to determine the backache syndrome spread in children we performed screening (questionnaire survey) of 6-16-year-old 600 students of Khimki gymnasium No. 16 grades 1-11. The screening involved 292 boys and 308 girls.

After that we studied complete clinical-laboratory examination data of 105 patients admitted to the neurology inpatient hospital with complaints of backache (54 girls and 51 boys) in order to analyze the appealability structure of vertebrogenic pain syndrome in children. Age structure of the patients was as follows: 3-6 years of age – 3 (3%), 7-11 years of age – 20 (19%), 12-18 years of age – 82 (78%) children. The patients underwent X-ray examination of vertebral column and, when indicated, magnetic resonance imaging of vertebral column and spinal marrow, electromyoneurography. Patients complaining of pains in lumbosacral spine underwent ultrasonic examination of kidneys and lower pelvic organs.

In order to evaluate complex treatment efficacy, we surveyed 35 patients (22 girls and 13 boys) in the follow-up period. We used visual analog scale (VAS) for pain dynamics and intensity determination and McGill Pain Questionnaire (MPQ) in order to evaluate pain syndrome intensity and psychoemotional condition of the patients.

We used χ -squared distribution for statistical data manipulation. We compared order variables in the two dependent samples with Wilcoxon test. For analysis, we employed software Statistica10 and Microsoft Excel 2010.

STUDY RESULTS AND DISCUSSION

Backache syndrome spread in children

116 (19%) students complained of recurrent backaches of varying localization during the screening survey. The obtained data indicate high spread of dorsalgiae in children. Other Russian researchers cite comparable results of analyzing spread of this pathology in children – 19-30% (D.N. Begun, 2003; Orenburg Region), 28% (N.G. Pravdyuk, 2007; Moscow). Girls complained of backache significantly more often than boys (72 and 44, respectively; $p < 0.01$). At the same time, the literature provides contradictory data. Some researchers associate dorsalgiae with the female sex and explain it with vertebral column biomechanics differences [7, 8], although other authors do not agree with this position, as they do not reveal significant differences between dorsalgia rates in boys and girls [9]. Backache was observed in 52 7-11-year-old children and 64 12-18-year-old children. The predominating types of dorsalgia were thoracalgiae (37%), lumbalgiae (30%) and cervicalgiae (21%). Overlapping pathology was observed in 13% of children. Dorsalgiae were caused by reflex muscular tonic syndromes.

Structure of vertebrogenic pain syndrome in children

On the second stage we examined 105 children hospitalized to the neurology inpatient hospital with complaints of backache. Prevalence of adolescent patients in our group (78%) corresponds with results of both foreign and Russian authors [10, 11]. As per the structure of dorsalgiae, lumbalgiae were observed in 55 (52%), cervicalgiae – in 31 (30%), thoracalgiae – in 19 (18%) patients.

Analysis of syndrome structure of cervical spine pains revealed prevalence of reflex pain syndrome observed in 29 (28%) patients. 11 out of 29 patients complained of cervicalgia, 10 – of cervicocranialgia resulting from reflex tension of craniovertebral muscles caused by pathology of craniovertebral osteoligamentous structures. Cervicobrachialgia – neckache with pain radiating to hand – was diagnosed in 8 patients. Pain syndrome was caused by reflex tension of anterior scalene muscle resulting from stimulation of fibrous ring, myo-articular structures and spine ligamentous apparatus receptors due to cervical osteochondrosis (anterior scalene muscle syndrome).

Radicular-vascular syndromes of cervical spine were observed in 2 cases only. One child was under surveillance after an acute spinal circulation failure in cervical anterior spinal artery circulation with clinical symptoms of mixed tetraparesis. Syndromum columnae posterioris vasculare pattern was observed in the 2nd patient.

According to the data obtained with instrumental research methods, vertebrogenic neckaches in the children involved in this trial were caused by juvenile cervical osteochondrosis (13 patients; 13%), functional instability of the vertebral locomotor segment as manifestation of hereditary syndrome connective tissue pathology (13; 13%; pic. 1) and cervical spine anomalies (5; 5%; pic. 2).

Thoracic spine pains were observed in 19 (18%) children involved in the trial; in all cases, they were manifested with reflex muscular tonic syndromes caused primarily both by idiopathic and secondary scolioses and kyphoscolioses (hereditary neuromuscular diseases, cerebral palsy; 9 children). The second most widespread cause was juvenile thoracic osteochondrosis (7 children). 3 children were diagnosed with Scheuermann's disease.

Lumbosacral spine pains were detected in 55 (52%) patients; in 36 cases, they were caused by reflex pain syndromes, especially lumbalgia (31 patients). Children complained of lumbar pain, which was usually asymmetrical and increasing at physical and long-term static load. Reflex muscular tonic lumboischialgia was present in 2 patients (2%) involved in our trial. In 3 patients (3%) pain syndrome was caused by reflex neurodystrophic lumboischialgia in the form of secondary piriformis syndrome, secondary to which compression sciatic neuropathy developed. 19 children (19%) were diagnosed with radicular lumbosacral pain syndrome.

The most widespread cause of lumbosacral pain syndrome was juvenile lumbosacral osteochondrosis (34 children). Lumbosacral spine anomalies represented by sacralization (4), lumbar hyperlordosis (3), congenital spondylolisthesis of lumbosacral passage (2), spinal stenosis (1) and lumbarization (1) were revealed in 11 patients. Disc protrusions (as a manifestation of hereditary syndrome connective tissue pathology) were revealed in 4 patients. 2 patients were diagnosed with spinal tumors, 3 – with Scheuermann's disease, 1 – with sacroileitis.

Complex therapy of backache syndrome in children

The treatment involved methods that are widely used in neurological practice, although we employed them keeping in mind age peculiarities. Amount and type of care rendered depended on the process's acuteness, intensity of symptoms, laboratory examination data and patient's age. We had to employ nonsteroidal anti-inflammatory drugs and perform drug blocking in the event of acute pain syndrome in the setting of high subjective pain assessment. Therapeutic exercises were indicated to all children at admission. Exercise set depended on pain intensity and was aimed both at spasmed muscles stretching and strengthening of the weakened core muscles. In the event of intense pain syndrome, the patients first received hardware spine electromassage with Hivamat system, after that – manual massage. Electrophoresis with Novocain were prescribed in the event of intense pain as well. Post-isometric muscular relaxation was employed in this case as a manual technique. Reflex therapy in children with intense pain syndrome was initially focused on the areas far from the pathological processes. Amount of exercises and physical load involved in therapeutic exercises would be higher in the event of subacute and chronic pain syndromes. The preferred physiotherapeutic technique was magnetic heat vibrotherapy, which, apparently, helped to relax the spasmed muscular area and improve local blood flow. In the event of scoliosis, we applied sinusoidal currents to the convex side of the scoliotic curve in order to stimulate and strengthen overstretched and weakened muscles. Manual therapy in this case involved not only post-isometric relaxation, but also use of mobilization techniques. Antidepressants were included to therapy in the event of intense chronic pain. In case the patients with subacute and chronic pain syndromes did not have counterindications, they also underwent a traction-countertraction course (various modes) and water treatment. All patients

were prescribed B vitamins unless they had allergy thereto. Muscle relaxants were prescribed in case of muscular tonic syndrome.

Complex therapy effectiveness evaluation

Complex approach to treating children with dorsalgiae was instrumental not only to inhibition disease progression, but also to achieving functionally significant regression of pain syndrome in most patients in a relatively short term, improving quality of life and prognosis and significantly reducing treatment and hospital stay duration, the latter being of high economic significance. As a rule, upon treatment completion we would achieve mental status correction concerning neurotic disorders (mood adjustment, introduction of activity motivation, confidence, reduced anxiety etc.). VAS and MPQ values were significantly higher before the treatment than after the performed therapy course.

We revealed positive correlation between the patient's VAS evaluation of pain and MPQ test results in 14-19 classes ($r = 0.4$ before treatment ($p < 0.02$) and $r = 0.8$ after treatment ($p < 0.01$)); this indicates direct correlation of the child's pain syndrome manifestation level with the level of affective disorders. The literature data also indicate that affective disorders are a prognostically significant factor of backache occurrence [12] and, vice versa, chronic pain-accompanied diseases lead to occurrence of anxiety and tension, which, in their turn, intensify pain perception [13].

CONCLUSION

The performed screening of backaches in students indicates high spread of dorsalgiae in children (19%); the older the children, the higher the risk; this is also confirmed by other studies [14].

The dorsalgia appealability structure is dominated by lumbosacral (52%) and cervical (30%) spinal pain syndromes, whereas thoracic pain syndromes are observed in 18% of cases. Mixed pain syndromes are observed in 21% of cases. We revealed that reflex pain syndrome is significantly more often observed both in the general child population and the hospitalized due to dorsalgiae (100 and 81%, respectively). Radicular pain syndromes are observed considerably less frequently. This corresponds with the literature data, according to which backache is most often local nociceptive or referred, i.e. is caused by skeletomuscular system lesion and direct stimulation of pain receptors. Backache due to cerebrospinal radix or ganglion injury is observed considerably less frequently and is neuropathic, i.e. is caused by central/peripheral nervous system involvement [15-17].

The main causes of vertebrogenic dorsalgiae in children are juvenile osteochondrosis and hereditary syndrome connective tissue pathology manifesting itself with functional instability of the vertebral locomotor segment, spondylolistheses (due to weak ligamentous apparatus) and disc protrusions. Hereditary spine anomalies comprise 15% in the structure of vertebrogenic dorsalgiae, scolioses (idiopathic, secondary) – 9%, Scheuermann's disease – 6%, tumors – 2%, sacroileitis – 1%. Osteochondrosis is the most widespread vertebrogenic pain syndrome in adults as well (according to trials [18] and [19]); at the same time, hereditary syndrome connective tissue pathology does not have any significant role in occurrence of backache syndromes in adults.

Complex age-dependent therapy helps to significantly reduce intensity or completely terminate pain syndrome and reduce the level of affective disorders.

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Pic. 1. Vertebral locomotor segment instability is revealed at maximum bending in functional X-ray presentations of cervical spine.



Pic. 2. Congenital block of C3-C4 vertebra is visible in lateral projection at maximum bending in X-ray presentations of cervical spine.

