Chronic tonsillitis in adolescents: clinical features and the role of ultrasound diagnosis in the northern region of Ukraine

Abstract. Background. Chronic tonsillitis is the most common disease among children and adolescents in the structure of pathology of the ENT organs. Untimely diagnosis and irrational treatment lead to decompensation of chronic tonsillitis and the development of lesions of many organs and systems of the child’s body of tonsillogenic origin. The aim of the work was to study the clinical features and ultrasound changes of the palatine tonsils in adolescents with chronic tonsillitis. Materials and methods. We have examined 47 children aged 13 to 17 years suffering from chronic tonsillitis: group I — 27 patients with compensated chronic tonsillitis, group II — 20 patients suffering from decompensated chronic tonsillitis. The control group consisted of 16 practically healthy children, representative in terms of age and gender. We used clinical methods, ultrasonography of the palatine tonsils, and statistical methods. The study was approved by the Institutional Bioethics Committee and it conforms to the principles outlined in the Declaration of Helsinki. Results. According to the results of an ultrasound examination of the palatine tonsils in children with chronic tonsillitis, the main changes were an increase in their transverse dimensions by more than 15 mm, deepening of lacunae, thickening of the capsule, fibrous changes. In addition, in patients with tonsillogenic lesions of the cardiovascular system and a decompensated form of chronic tonsillitis, the pathological signs of the disease according to ultrasound were more significant and were manifested by unclear contours, increased echogenicity, heterogeneous hyperechoic structure, diffuse fibrous and cystic changes of the palatine tonsils. Conclusions. Ultrasonography of the palatine tonsils is a non-invasive, painless, accessible and informative method for studying the structure of the tonsils in normal and pathological conditions. It allows for a more thorough assessment of their changes in compensated and decompensated forms of chronic tonsillitis. Keywords: children; ultrasonography; tonsillitis; palatine tonsils
The palatine tonsils have become a reservoir of infection where it can spread throughout the body. It can be the cause of tonsillogenic damage to organs and systems, which, in turn, suppresses immunity and leads to the development of chronic tonsillitis decompensation. In this way, a vicious cycle is formed [9, 10].

Chronic tonsillitis is dangerous due to complications associated with the generalization of infection and toxic effects on the body. These include paratonsillar abscesses, lesions of the kidneys, joints, heart and blood vessels. Thus, the inflammatory process in the tonsils has a toxic, allergic and reflex effect on the organs and systems of the child’s body [11].

There are not many diagnostic methods we can use in this case, but one of the available and informative ones is ultrasound. The main advantages of ultrasound examination are high informativeness, non-invasiveness, safety for children’s body, painlessness; it can be used at any age. The use of ultrasound examination of the tonsils in children with chronic tonsillitis is a supplement to the visual examination and it allows to determine the condition of the tonsil tissues, the presence of cysts or scar changes [12, 13].

Therefore, the study of ways to improve the diagnosis of chronic tonsillitis in children is extremely relevant at the current stage.

The purpose of the work was to study the clinical features and ultrasound changes of the palatine tonsils in adolescents with chronic tonsillitis.

Materials and methods

The study involved 47 children aged 13 to 17 years (25 girls and 22 boys) suffering from chronic tonsillitis. They were examined to study the clinical features of the course of chronic tonsillitis and the condition of the palatine tonsils according to the ultrasound examination. Patients were divided into two groups: group I — 27 children with compensated chronic tonsillitis, group II — 20 patients suffering from decompensated chronic tonsillitis. The control group consisted of 16 practically healthy children, representative in terms of age and gender. The state of compensation was assessed taking into account the child’s well-being, the presence of complaints and damage to other organs and systems of tonsillogenic origin. The state of decompensation was estimated by the presence of not only local signs of chronic tonsillitis, but also persistent low fever, tonsillar inflammation, enlargement of the upper anterior and posterior arches (Preobrazhensky’s symptom) in 29.63 ± 8.96 % and 60.00 ± 11.24 % of cases (p < 0.05), respectively. In addition, tonsil hypertrophy degree I was observed in 33.33 ± 9.25 % and 15.00 ± 8.19 % (p < 0.05) of patients of groups I and II, respectively, cicatricial adhesions between tonsils and palatine arches in 44.44 ± 9.75 % and in 90.00 ± 6.88 % (p < 0.05), expanded and deepened lacunae with pathological purulent content in 51.85 ± 9.80 % and 80.00 ± 9.18 % (p < 0.05), swelling of the upper corner formed by anterior and posterior arches (Zak’s symptom) in 48.15 ± 9.80 % and 45.00 ± 11.41 %, roller-like thickening of the edges of the upper anterior and posterior arches (Preobrazhensky’s symptom) in 29.63 ± 8.96 % and 60.00 ± 11.24 % of cases (p < 0.05), respectively. In addition, tonsil hypertrophy degree I was observed in 33.33 ± 9.25 % and 15.00 ± 8.19 % (p < 0.05) of patients of groups I and II, respectively, degree II — in 55.56 ± 9.75 % and 60.00 ± 11.24 %, and degree III — in 40.00 ± 11.24 % of patients of only group II (p < 0.05).

The ultrasonic examination in practically healthy children visualized tonsils of medium echogenicity, they had a transverse size of up to 15 mm, an oval shape, clear contours, a homogeneous structure, the lacunae were not deepened, with no pathological content.

Pathological changes of the palatine tonsils, according to ultrasound examination in chronic tonsillitis, differed in patients of groups I and II.

Thus, in children with compensated chronic tonsillitis, the tonsils on the echogram had an average echogenicity (88.89 ± 6.16 %), clear contours and a homogeneous structure (92.59 ± 5.01 %), a transverse size of 15–20 mm (85.19 ± 6.97 %). In addition, there were isolated fibrous changes (48.15 ± 9.80 %), deepening of lacunae up to 2 mm (85.19 ± 6.97 %) and thickening of the tonsillar capsule (81.48 ± 7.62 %).

In patients with decompensated chronic tonsillitis, compared to those with compensated tonsillitis, there were more...
pronounced changes in the palatine tonsils. They were manifested by thickening of the capsule, hyperchoic inhomogeneous structure in 95.00 ± 5.00 % of children (p < 0.05), an increase in size of more than 20 mm in 80.00 ± 9.18 % of cases and a deepening of lacunae more than 2 mm in 85.00 ± 8.19 % (p < 0.05). In addition, multiple diffuse changes in the palatine tonsils (85.00 ± 8.19 %) and cysts (30.00 ± 10.51 %) were detected in the patients of group I, in contrast to group II (p < 0.05).

Discussion

Analyzing literary sources on chronic tonsillitis, it was found that ultrasound diagnosis of palatine tonsils and neck is a topical issue for scientists in recent years. However, this problem remains understudied. Thus, Haryuk O.G., Yevdokymenko V.I. developed the technique of ultrasound of the palatine tonsils and studied the role of this method in monitoring the effectiveness of cryosurgical treatment for chronic tonsillitis [14].

Trukhin D.V. studied the state of the palatine tonsils and lymph nodes in chronic tonsillitis by ultrasound, but only in adults. He differentiated the changes in various forms of the disease and found that patients with the allergic-toxic chronic tonsillitis had more pronounced changes in the tonsils, such as their irregular shape, unclear contours, the presence of additional inclusions, hypochoecogenicity [13].

Most researchers studied the state of parapharyngeal tissues by ultrasound [9, 14] and also analyzed the size of tonsils [10–12].

Thus, Chung D., Bandarkar A. showed that threedimensional ultrasound would help to assess the degree of tonsillar hypertrophy for the potential identification and stratification of candidates for tonsillectomy [17].

Perry J.L., Haenssler A.E. performed lateral view magnetic resonance imaging to analyze palatopharyngeal variables in 270 participants aged 3 months to 34 years. The authors reported that qualitatively adenoid growth progresses in an anterior and inferior direction, whereas involution occurs in a posterior and superior direction [18].

Aydin S., Uner C. noted that despite the wide use and informativeness of magnetic resonance imaging and computer tomography in assessing the state of the palatine tonsils, these methods have some limitations. First of all, it is high cost. The next one it is necessity to use sedatives, and the impact of ionization radiation. These factors are quite important in pediatric practice. Whereas, in the absence of these limitations, ultrasound examination is more often used in pediatric practice [19].

However, diagnostic criteria for compensated and decompensated chronic tonsillitis, as well as morphological features of the palatine tonsils in childhood according to ultrasound data, remain understudied.

Conclusions

So, according to the results of an ultrasound examination of the palatine tonsils, the main changes in children with chronic tonsillitis were an increase in their transverse dimensions by more than 15 mm, a deepening of the lacunae, a thickening of the capsule, and fibrous changes. Also, in patients with tonsillogenic lesions of the cardiovascular system and a decompensated form of chronic tonsillitis, the pathological signs of the disease according to ultrasound were more significant and were manifested by unclear contours, increased echogenicity, heterogeneous hyperchoic structure, diffuse fibrous and cystic changes of the palatine tonsils.

Thus, ultrasonography of the palatine tonsils is a non-invasive, painless, accessible and informative method for studying the structure of the tonsils in normal and pathological conditions. It allows for a more thorough assessment of their changes in compensated and decompensated forms of chronic tonsillitis. Therefore, it is expedient and relevant at the current stage to supplement the diagnosis of chronic tonsillitis in children by conducting an ultrasonic examination of the palatine tonsils.

References

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Хронічний тонзиліт у підлітків: клінічні особливості та роль ультразвукової діагностики

Резюме. Актуальність. Хронічний тонзиліт є найбільш поширенням захворюванням серед дітей та підлітків у структурі патології лор-органів. Невчасна діагностика й нераціональне ширення захворювання серед дітей та підлітків у структурі навколишнього середовища здатне призвести до непередбачуваних результатів. Мета роботи: вивчити клінічні особливості та ультразвукові зміни піднебінних мигдаликів у хронічному тонзиліти.

Матеріали та методи. Було обстежено 37 дітей віком від 13 до 17 років, хворих на хронічний тонзиліт. І група — 27 дітей з компенсованим хронічним тонзилітом, ІІ група — 20 пацієнтів, які страждають від декомпенсованих форм хронічного тонзиліту. Усіх дітей упроваджено до дослідницького процесу матеріалами та методами.

Результати. За результатами ультразвукового дослідження піднебінних мигдаликів у дітей, хворих на хронічний тонзиліт, основними змінами були: збільшення їх поперечних розмірів, поглиблення лакун, зменшення шарнірів. Крім цього, у пацієнтів із тонзилогенними ураженнями серце-судинної системи, діагностована рятувальна лакуна угрупованої тонзиліту.

Ключові слова: літні; ультразвукова діагностика; тонзиліт; піднебінні мигдалики.