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Dear Colleagues,

As clinicians and researchers, obstacles are always before us, especially when working against pediatric diseases. Knowledge of treatment for children's diseases is often insufficient because of these interferences. You have to define strategies to solve problems in the route of treatment that contains not only the treatment for the specific disease but also the management of parents' psychology and other possible diseases that may add or be present. Also, you have to think about possible surgeries, courses of anesthesia, and nursing services that consist of the whole treatment process and, perhaps, hospitalization.

In contemporary health services, one can realize that colleagues must come together to lead a successful treatment. Being together, talking about all possible opportunities, and, better than this, working together to concentrate policies on children at every chance will be the best way to upgrade children's therapies.

Nowadays, we have informatics for all these disciplines. However, these efforts are far apart than we expected.

As a vital base of our philosophy, all health providers on children's wellness, like surgeons, anesthetists, nurses, and technicians, have to gather and interact to represent our ideas of collaborative management for treatments, particularly for surgical problems. We cordially hope that this journal will be a common field of presentation of our scope. We also hope that the journal will not only be a medium for declaring manuscripts but also a ground for succeeding in forming protocols for treating and managing child diseases.

Best Regards,

Prof. Atilla ŞENAYLI
Editor in Chief

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Surgery on Children

Original Article

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Opinions and approaches of pediatric surgery specialists and residents about neonatal resuscitation program-NRP: survey study

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ABSTRACT

Aims: The Neonatal Resuscitation Program (NRP) is a course for healthcare professionals who can be called "those who touch the baby at the time of birth". The knowledge and skills obtained through this training program can be used in infant resuscitation at the time of birth and neonatal period resuscitation, which includes the first 30 days of life. It is aimed to evaluate the approaches of pediatric surgeons and residents in terms of their opinions and practices regarding NRP, as there are publications in the literature about the NRP experiences of other healthcare professionals.

Methods: After receiving the approval of the Ethics Committee, the survey was published as a descriptive and cross-sectional study via the Google Docs system, and the participation of pediatric surgeons and residents was requested. Our research was conducted between October 2023 and March 2024 by asking the participants survey form questions via communication tools such as e-mail, telephone, social media, Internet. Data were sent to participants in the form of electronically prepared survey forms via e-mail addresses and social media platforms. It was collected electronically within the date ranges determined for the research.

Results: Thirty-seven participants were male, and 40 participants were female. The average age of 77 pediatric surgeons who participated in the survey was determined to be 43.8 years old. Seventeen of the participants are residents; 24 of them are specialist physicians; 10 of them are Dr. Lecturers; 12 of them are associate professors; 14 of them were professors. It was determined that 48 of 77 physicians took the NRP course. It has been determined that those who took the NRP course can contribute more to resuscitation practices.

Conclusion: It has been stated that pediatric surgeons are familiar with NRP applications and that as clinical experience increases, even among those who have not taken the course, interventions by NRP can be performed. It is seen that pediatric surgeons can effectively participate in NRP courses.

Keywords: Neonatal, resuscitation, program

INTRODUCTION

Neonatal Resuscitation Program (NRP) is a course first launched in 1985 by the American Heart Association (AHA) and the American Academy of Pediatrics (AAP).[1] The program was initiated after studies found that most children requiring neonatal resuscitation did not receive appropriate assistance.[2] The primary purpose of this training is to prevent deaths and disabilities, mainly due to asphyxia, by training healthcare professionals who can evaluate the newborn at the time of birth and perform resuscitation on babies who have difficulty in transitioning from the womb to extrauterine life.[3]

10-19% of births in the world require resuscitation procedures at birth.[4-6] There may be a need for positive pressure ventilation (PPV) in 3% and intubation and cardiopulmonary resuscitation in 1%.[5,6] However, on average, 4 million newborns are affected worldwide yearly.[3,4] In fact, in some countries, perinatal asphyxia is the leading cause of neonatal death.[3] One study determined that, when evaluated in general, 98% of deaths occur in countries with low or medium development levels.[7] In a study conducted in China, it was determined that the cause of 20.5% of newborn deaths, that is, the deaths of 73,000 babies, was perinatal asphyxia.[8] This number was determined to be 29,000 annually in Ghana.[9] When we look at the ratio of the populations of China and Ghana, it can be understood that Ghana's losses are high. If newborn deaths in China were based on the rate

of Ghana's population, it would mean 1 million 400 thousand newborn deaths per year. However, perinatal asphyxia also has the effect of causing cerebral palsy, epilepsy, and chronic neurological diseases in a significant number of newborns.[4,8]

The Neonatal Resuscitation Program includes general practitioners, pediatricians, emergency medicine, family physicians, anesthesiology and reanimation, gynecology and obstetrics, pediatric surgery doctors, as well as midwives, nurses, anesthesia technicians and technicians, and medical officers, whom we can call "those who touch the baby at the time of birth". It is aimed at allied healthcare professionals such as emergency medical technicians and paramedics. The knowledge and skills obtained through this training program are used not only in the resuscitation of babies at the time of birth but also in neonatal resuscitation, which includes the first 30 days of life.

Regardless of the branch, the most critical factor that affects the quality of education of healthcare providers who will take the NRP course is that they have knowledge and skill training that can be compatible with the NRP course in their training curriculum.[10] In a study, the conditions of pediatricians, anesthesiologists, and gynecologists during the course were compared, and it was understood that although pediatricians and anesthetists showed similar characteristics, gynecologists differed.[10]

There may be differences in the procedure levels of physicians working in pediatric surgery, but pediatric surgeons have almost no NRP training, skills, or knowledge of the literature. Therefore, in our study, we aimed to analyze, through a survey, the approaches and opinions of pediatric surgeons who have to perform neonatal resuscitation in their professional lives regarding NRP training and practices.

METHODS

Two studies can be done regarding NRP activity.[11] The first is to measure the successful effects of neonatal resuscitation practices after training.[11] The second is to evaluate the course participants in terms of their knowledge level and skill confidence after the course.[11] In our study, evaluation was made using the second method.

After receiving the approval of the Yozgat Bozok University Social and Human Sciences Ethics Committee (Date: 20.09.2023, Decision No: 06/17), our research was conducted between October 2023 and March 2024 by asking participants survey-form questions via communication tools such as e-mail, telephone, social media, and the internet. The research population comprises pediatric surgeons and pediatric surgery assistants receiving pediatric surgery specialty training in Yozgat Bozok University. All pediatric surgery doctors in the country will be included in the study through associations, academic platforms (congresses, seminars, etc.), and social media, and the analysis of the data obtained from the study will be based on these data. Data were sent to participants in the form of electronically prepared survey forms via e-mail addresses and social media platforms. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

RESULTS

According to the survey results, the numerical distribution of the opinions of pediatric surgeons at various levels who have taken the NRP course and those who have not taken the NRP course, and their knowledge, skills, and self-confidence are shown in Table. The average age of 77 pediatric surgeons who participated in the survey was determined to be 43.[8] years old. Thirty-seven participants were male, and 40 participants were female. Seventeen participants are residents in their first five years of education. Fifteen participants were 6-10 years in profession, 8 participants were 11-15 years in profession, 12 participants had been in pediatric surgery for 16-20 years, and 30 participants had been in pediatric surgery for 21 years or more.

Five participants answered the survey in Ministry of Health hospitals, 27 in state universities, 23 in Ministry of Health training hospitals, 9 in affiliated university hospitals, 4 in private hospitals, 7 in new model city hospitals, and 2 in foundation universities.

Seventeen participants are residents; twenty-four are specialist physicians; ten are Dr. Lecturer; twelve are associate professors; fourteen were professors.

Forty-eight participants took the NRP course. Twenty-nine participants still need to take a course. It has been determined that there are births and neonatal units in hospitals where the majority of course participants are. However, it has been understood that the cases in which physicians perform neonatal resuscitations are rare. It has been observed that the number of people who give positive answers increases as academic seniority increases regarding knowledge and, skills and self-confidence regarding NRP.

Sixteen of those took the NRP course within five years; 20 of them were 6-10 years ago; 7 of them were 11-15 years ago; Three of them were found to have taken the NRP course 16-20 years ago, and three more than 21 years ago. It turned out that there were no repeat courses.

The group that gave the least positive answers in terms of practice is seen as residents. This may be because they are at the beginning of their education process. However, it the lack of births and neonatal units in the institutions where they receive training may be practical, based on the response given by this group.

DISCUSSION

Evaluation of the condition of newborns after birth started with the assessment scoring of Virginia Apgar, identified with her surname.[12] Nowadays, it has become mandatory to evaluate babies, whether mature or premature, at the time of birth and to understand that their vital functions are expected, in order to minimize the morbidity and mortality of babies. The level of knowledge about NRP at the physician level and ensuring that one person, whether a physician or not, is present in the team as an NRP trained person during birth is essential in terms of reducing morbidity and mortality.[4] Studies have been carried out on the knowledge and skills of this group, mainly due to the expectation that relevant physicians have mastery of the subject. In our study, it is pleasing that branches such as pediatric surgery, where the possibility of intrapartum work is relatively low, show interest in NRP programs and constitute the majority of survey participants.

In the study conducted in China, it was determined that with the introduction of NRP applications, the time to start initial

Table. Distributions of without NRP and with NRP residents and specialist for knowledge and training abilities

No./Appl	Without NRP	**With NRP**	Without NRP	**With NRP**	Without NRP	**With NRP**	Without NRP	**With NRP**	Without NRP	**With NRP**
	Resident	**Resident**	Spec	**Spec**	Assist. Prof	**Assist. Prof**	Assoc. Prof	**Assoc. Prof**	Prof.	**Prof.**
Number	12	**5**	8	**16**	1	**9**	3	**9**	5	**9**
Age (years)	39.8	**31.6**	41.6	**59.3**	52	**48.7**	46.2	**47.8**	55.5	**49.4**
Birth in inst	12	**5**	7	**15**	1	**8**	3	**9**	5	**9**
NICU in inst	12	**5**	7	**14**	1	**7**	2	**9**	5	**9**
Neonate resuscita	5	**3**	2	**3**	1	**4**	1	**5**	3	**3**
Ped surge need NRP?	10	**4**	7	**14**	1	**7**	3	**9**	4	**9**
Is vent. support most important?	8	**5**	5	**11**	0	**8**	3	**9**	3	**9**
T piece system appl	1	**1**	1	**6**	0	**3**	1	**3**	1	**4**
Affect vent appl	5	**3**	4	**9**	0	**6**	1	**6**	3	**9**
MR SOPA appl	1	**0**	1	**5**	0	**2**	1	**1**	1	**4**
PPV appl	3	**2**	4	**13**	0	**6**	1	**6**	5	**9**
Early stage appl	4	**2**	3	**11**	0	**6**	1	**5**	4	**8**
CPAP appl	3	**2**	4	**13**	0	**6**	1	**6**	5	**9**
Umb cord cath appl	5	**3**	5	**12**	0	**8**	1	**7**	5	**9**
L mask insert appl	7	**3**	4	**12**	0	**8**	1	**6**	4	**8**
Plevral drain appl	7	**4**	7	**13**	0	**8**	2	**7**	5	**9**
Mild extantion appl	6	**3**	4	**11**	0	**7**	1	**6**	5	**9**

No: Number of patients, Inst.: Institution, PPV: Positive Pressure Ventilation; CPAP: Continious Positive Airway Pressure; MR SOPA: Mask ventilation correction steps acronym (M: Mask adjustment, R:Repositioning of head and neck,S: Suction mouth and nose, O: Open mouth, P: Pressure increase, A:Alternative airway), L. Mask: Laringeal Mask

stage applications for asphyctic newborns was shortened. This, valuable time was used well for diagnosis, and, in this case, it made a significant contribution to preventing asphyxia problems in newborns.[8] In our study, the number of people who answered "I can perform initial practices when needed" for resuscitation after the evaluation of the newborn constituted more than 50% of the survey participants. 75% of those who could apply the initial step consisted of the group that had received NRP. It was evaluated as significant in terms of the effect of NRP.

When respiratory weakness is detected in premature babies, the decision to apply positive pressure ventilation (PPV) may be indicated.[13] In our study, it was stated that PPV could be performed at a rate of 63%. A study conducted in India found that only 18% of patients applied CPAP in the delivery room.[4]

It has been stated that in Kenya and Pakistan, training has been organized, especially on the use of balloons and masks, and that this is due to the conditions of the countries.[7] It was determined that skill levels in this training remained at low levels of 31% in Kenya and 46% in Pakistan.[7] It has also been stated that this may be not being accustomed to the OSCE training method.[7] There is no need for such separation in our country because standard facilities are provided for NRP applications in the country, and deficiencies are quickly reinforced. A benefit of NRP courses is the awareness of the intertwined obstetric and neonatal partnership during birth.[3] It is also an optimized program in that people who may not be able to intubate the patient indirectly can intervene in the newborn without the need for this procedure.[3] In a study conducted in Canada, considering only the intubation procedure among NRP procedures, it was determined that the success of the first practitioner was 73%. In comparison, the success of the residents was 63% and was described as failure.[14] The same study also stated that these rates were between 50-62% for the USA.[14] In the study in India, it was understood that most physicians were optimistic about the endotracheal aspiration procedure.[4] The survey showed that pediatric surgeons in our country determined that respiratory support for the newborn is essential. Unlike India, in our country, the majority (70%) stated that laryngeal mask application, not endotracheal tube, could be applied. The study conducted in India determined that 63.5% of the physicians started giving oxygen from the beginning and did not prefer room air.4 It has been stated that this rate is approximately 15% in the United Kingdom.[4] This rate was 97% in Canada and 71.7% in the United Kingdom.[4] It has been stated that pediatric surgeons, especially those who take the NRP course in our country, have knowledge and skills regarding laryngeal mask insertion, oxygen and respiratory support. It is understood that residents need more awareness of this. Considering that the number of NRP course recipients for residents is limited, it was thought that an NRP course for respiratory support would be meaningful.

In the study conducted in India, it was observed that 54% of the participating physicians worked in neonatal intensive care units and provided variable information about umbilical cord clamping.[4] The cord was clamped and cut immediately in 61.9% of the cases, while the rest waited 1 minute.[4] In our survey, pediatric surgeons were not asked about clamping the umbilical cord during birth, as pediatric surgeons almost

never perform it, that is, it has no practical meaning. The ability to insert an umbilical cord catheter when necessary was significant.

It has been determined that there are significant differences between the training received in countries such as Canada, Oman, Poland, Spain, Nepal, and the United Kingdom and the use of these trainings as standard. Studies show that NRP training is forgotten within 6-12 months if not used effectively.[1] For this reason, more frequent rotations in neonatal care units are envisaged.[1] Simulation training has been developed in case there are problems in achieving this due to technical and process problems.[1] It was understood in our study that pediatric surgeons and residents constitute the minority of those who have taken the course less than five years ago. We thought that the course is not taken regularly because it seems to have low priority for pediatric surgeons to take it.

During NRP implementations, it has been determined that, 30% of the steps are skipped.[15] There is an opinion that this situation is related to not showing teamwork activity.[15] The study suggested that the application could be more effective if teamwork were carried out.[15] It has been reported that this aspect of the role-play process could be stronger due to the lack of teamwork training in the NRP course.[15] Although there will be little need for pediatric surgeons to apply NRP in our country, it is understood that they want to take part in teamwork by attending courses. Not taking repeat courses suggests that there will be deficiencies in practice. No questions were asked about this in our study.

CONCLUSION

This study would fill a gap in the literature in evaluating the participation, perspective, and opinions of pediatric surgery researchers and specialists in NRP courses. The fact that the majority of studies in the literature concluded that nurses, midwives, pediatricians, and anesthesia, indirectly, prevents other branches from emerging to contribute intrapartum applications. It is understood from this study that pediatric surgeons can be quickly adapted to NRP practices and take an active role.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Yozgat Bozok University Social and Human Sciences Ethics Committee (Date: 20.09.2023, Decision No: 06/17).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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Surgery on Children

Review

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Surgery preferences for thyroid diseases in childhood: review of the literature due to a case experience

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ABSTRACT

The authors have not decided well about the requirement of thyroid surgery in childhood. There are reasons for this controversy. Some of these controversies are various diseases, differences in evaluations of the diseases, and various follow-ups. So, treatments in different institutions are most diverse. All these things may confuse surgeons who perform surgery in this age group. A patient was operated on a 17-year-old girl whom the pediatric endocrinology department followed up for three years with a thyroid nodule diagnosis. Thyroid function tests were regular. In ultrasonography, a nodule in the left thyroid lobe was detected. The nodule had grown over the years and reached a size of 2×1.5×1.4 cm. E×cision was planned when a definitive result could not be reached after fine-needle aspiration biopsies were repeated three times in our hospital. Since the entire fine needle aspiration examinations were inconclusive, only a left lobectomy was performed. After pathology examination resulted in follicular carcinoma, right lobectomy with isthmectomy was added to the procedure. As a result, a total thyroidectomy in 2-stage was performed. Because of this surgical course of the patient, it was decided to examine the surgical choices of thyroid diseases in children like Graves' disease and benign and malignant nodules. Literature was evaluated to understand if there is an algorithm for decision-making on pediatric thyroid surgery.

Keywords: Children, thyroid, disease, nodule, adenoma, surgery

INTRODUCTION

Thyroid diseases are less common in childhood than in adults.[1-3] Among thyroidal diseases, girls are generally affected.[4] Most pediatric patients are asymptomatic and often discovered by their family or pediatrician.[5] Children with thyroid disease are mostly diagnosed with Graves' disease, nodules, or thyroid malignancies.[3] Thanks to developing drug protocols, surgery is rarely needed nowadays. Nevertheless, when surgery is needed, making the decision is controversial for surgical preferences among subtotal, near-total, or total excisions. This review was planned after the case was operated on in two stages.

As a non-tumor disease, Graves' disease is the most common cause of hyperthyroidism in children, which may indicate surgery.[6,7] Thyrotoxicosis is a clinical indicator of hyperthyroidism, and, luckily, it is not usually seen clinically in children.[6,7] In these types of diseases, scintigraphy is a useful method to decide about the function of lesions.[5] Nodules captured radioiodine could be benign beyond the expected malignity rates.[5] In contrast, nodules that do not capture radioactive material may be malign disease in the range of 20% to 60%.[5] So, scintigraphy is mainly used to locate lesion.[5]

Graves' disease can be treated with multiple methods.[7] The first choice in treating Graves' disease is anti-thyroid drugs, but relapse in children is 20-30%.[6,8] Therefore, surgical treatment can be required.[7] The indications for surgery for Graves' disease are often related to the preferences of parents or, sometimes, patients.[7] Parents usually accept surgery considering the costs of medication or the possibility of drug inefficacy.[7] When surgery is decided, the optimum choice seems to be total thyroidectomy in Graves' disease older than five years.[6]

The rate of benign nodular thyroid diseases in children is 1.5%.[9] As benign diseases are rare in childhood, the surgical criteria for this group of diseases are lacking. Therefore, with all the available data, the American Thyroid Association (ATA) published about pediatric treatment guide in 2015.[10] In the guideline, fine needle aspiration (FNA) is strongly advised.[10] If surgery is needed, conservative surgery is gradually preferred in nodule treatments.[3,10] Depending on size, compressive symptoms, cosmetic concerns, or parents'/patients' choice, surgery may be partial thyroidectomy, lobectomy-isthmectomy, or nodular resection in unilateral and benign pathology.[8-10] Therefore, treatment modalities in benign thyroid nodules may include clinical, surgical, or both applications, as in adults.[11]

Thyroid cancers represent 0.5-3% of childhood tumors.[5] However, among the thyroidal disease population in childhood, cancer is seen between 14% and 40%.[12] Thyroid carcinomas are most seen with endocrine neoplasms in childhood, and their incidence is 4-7 / million.[13] Compared with all age groups, childhood thyroid cancers constitute 10% of total thyroid cancers.[4]

Many studies show that thyroid carcinomas in childhood differ from carcinomas in adulthood in terms of formation and process.[14] Papillary carcinomas are seen in 90% of malignant thyroid cancers.[2,13] Follicular carcinomas are the second seen carcinomas in adults, but it is rare in childhood.[2,13] The most common causes of carcinomas are iodine deficiency and exposure to ionizing radiation.[13,15] The probability of developing thyroid cancer within 3-4 years is between 1-7% in those exposed to 100 to 700 cGray radiation.[15]

If nodules with suspicious US findings are growing, then nodules may be evaluated as malign.[10] The guideline reported that nodules greater than 4 cm could be considered malign tumors.[10] American Thyroid Association (ATA) recommended total thyroidectomy and radioiodine ablation for papillary thyroid carcinoma in 2009.[16] In the 2015 guideline, operation preference is not as confident as in 2009, but lobectomy seemed to be the main suggestion. In Japan, while lobectomy is recommended for papillary carcinoma, there is an opinion that radioiodine ablation is not required.[16] In general opinion, total thyroidectomy is not recommended.[14]

Since malignant thyroid nodules in childhood are less common than in adults, the reported FNA results are also fewer.[12] In addition, fine-needle aspiration biopsies performed to evaluate follicular carcinomas are generally insufficient.[13] FNA biopsy (FNAB) is the first choice in patients with thyroid nodules due to its simplicity, effectiveness, and cost-performance appropriateness.[15] In some clinics, the preferred application size is 1 cm.[15]

Surgery may be performed for malignancy, drug unresponsiveness, and some benign diseases.[1] In these diseases, the preferences for the form of thyroidectomies, such as total or almost total, may differ.[1,2]

In this report, we evaluated the decision-making criteria of the authors regarding different types of thyroid diseases. Also, we compared our patient's surgical history with the literature to strengthen our evidence-based medical practice.

METHOD

English literature is evaluated by using google scholar. Keywords consisting of "Children," "Thyroid," "Disease," "Nodule," "Adenoma," and "Surgery" were decided to be the leading search points in the literature. The main keywords were children and thyroid, and articles that did not have information related to these two keywords were excluded. After this, filtration surgery was searched in the remaining literature. This group of articles was classified according to "Disease," "Nodule," and "Adenoma" keywords.

Articles containing discussions on surgical procedures were selected and added to the reference list.

Google Scholar was searched in a month. As this database is extensive, enough sources other than English were not evaluated.

In the literature, systematic information about decision-making for thyroid surgery in children is among the least evaluated subjects. Thyroid surgeries were usually defined in different protocols. Also, various diseases were defined on this subject. As a result of these circumstances, finding a systematized conclusion was difficult. Unclarity had to be why the authors left the subject open-ended.

The data collection process was performed by only one person (A.S.). All the data was correlated with keywords. When articles were eligible, descriptions of diseases were classified, and surgeons' experiences were read. Treatment modalities that the authors preferred were evaluated. Especially if different thyroidectomy types were defined, they were noted. There were small groups with various findings, so accountability for the conclusions was impossible. Descriptive information without trying to make a statistical comparison was preferred.

CASE

The pediatric endocrinology outpatient clinic consulted a seventeen-year-old girl because of a thyroid nodule. The patient had palpated a mass in the thyroid gland region. She had no complaints about swallowing or breathing. She did not have complaints such as sweating at night or other complaints that would suggest hyperthyroidism. On examination of the patient, there was an apparent and palpable nodule on inspection in the left thyroid lobe. The right lobe was normal. There was no lymphadenopathy on the neck examination. Thyroid function tests were regular. Complete Blood Count (CBC) and blood biochemistry values were also average. The most recent ultrasonography examination showed a 2×1.5×1.4 cm diameter nodule in the left lobe. Thyroid scintigraphy was unremarkable except for the hypoactive nodule appearance. Three FNAB trials were not definitive, but hypoactive nodule or follicular adenoma was a possible diagnosis. Thereupon, a left-lobe thyroidectomy was done. A frozen biopsy was not performed during surgery. A Jackson-Pratt drain was inserted, and the operation was ended. There was no vocal cord problem, bleeding, or calcium level change after the surgery. The patient was discharged the next day without any problem. A week later, specimen evaluation was concluded as angio-invasive type follicular carcinoma. Therefore, a second operation was done to remove the remaining right lobe. Right lobe thyroidectomy and isthmectomy were performed three weeks later. The right lobe was seen as entirely usual in surgery. The patient was discharged one day later without any complications. Pathology diagnosis resulted in nodular goiter for the right lobe.

Two months later, the patient's control examination and analysis were regular, and radioiodine ablation treatment was applied. Follow-up was routine in the postoperative 11th month. She has hormone replacement therapy regularly.

Parents had their consent in writing the patient's clinical progress with only the condition of not presenting her identity information. The patient's identity is not presented.

DISCUSSION

Total thyroidectomy is usually accepted as surgical treatment in adulthood.[1] In children, on the contrary, surgery preferences of the thyroid change according to circumstances.[1] Surgery can be planned according to general criteria or according to various specific criteria.[17] It is necessary to learn patient history and make examinations such as USG and fine-needle aspiration biopsy (FNAB); consequently, it is essential to understand the disease.[17] As American Thyroid Association (ATA) refers, total thyroidectomy may be performed for some differentiated malignancies.[8] Partial thyroidectomy may be the choice in cases that are strongly considered benign.[8] In this study, we evaluate which type of thyroid excision can be chosen in childhood for different thyroid problems and examine the thyroid disorders in 3 groups: Benign thyroid diseases, benign thyroid nodules, and malignant thyroid nodules.

Benign Thyroid Diseases

Graves' disease is the most operated benign disorder of the thyroid. Subtotal thyroidectomy was the first choice in the 90s for Graves, but later it was abandoned.[7] The reason to abandon subtotal thyroidectomy is the incidence of high recurrence. 65% of surgeons worldwide prefer near-total thyroidectomy for Graves' disease. To a lesser extent, total thyroidectomy was preferred. Authors who preferred total thyroidectomy reported that near-total thyroidectomy is insufficient to cure Graves' disease.

In making a proper decision, one follow-up criterion for the operation's success is the course of ophthalmopathy.[7]

Benign Thyroid Nodules

As in adults, nodular lesions are primarily seen in girls in childhood.[9] It can be easily thought that this situation may occur with the difference of genetically monoclonal or polyclonal origin.[9] Treatment of thyroid nodules is usually decided depending on the clinical evaluation and FNAB.[5] The basis of surgical excision also depends on histological evaluation.[5] Subtotal excision seems sufficient in benign lesions such as cysts, colloidal nodules, congenital anomalies, and nontoxic goiter.[5] A staged surgery method can be preferred in the surgical treatment of nodules, and it can prevent excessive surgery.[2] Most experts recommend that if the nodules are in a single lobe in pediatric patients, lobectomy and isthmectomy should be sufficient.[9] Millman et al.[5] reported 141 patients with different thyroid diseases in their series, and within the study, as a subgroup, there were 45 patients with benign nodules. Four had a total thyroidectomy, 41 had a partial thyroidectomy, and partial resections consisted of subtotal, lobectomy, and isthmectomy or lobectomy.[5] In their follow-ups, two patients with benign problems had recurrence.[5] Although some information about the treatments of nodular lesions seems to be tissue-protective, contrary to this information, surgical treatment in multinodular goiter is usually performed as total thyroidectomy in practice.[9] Unwanted nodular recurrence may be the reason for this, and it is essential in deciding surgical success. However, there are no specific criteria for predicting the occurrence of nodule recurrence.[9] The recurrence rate in nodular diseases is 7.2% for adults.[9] More than one nodule also causes a significant increase in recurrence rate compared to recurrence caused by a single nodule.[9] It is difficult to define the incidence because even simple variables such as volume increase or the presence of nodules are reported as a "recurrence".[9]

It is reported that the probability of hypothyroidism in adults after hemithyroidectomy is between 10.9% and 42.6%. In adults, hypothyroidism may be clinically asymptomatic, but growth, bone development, and cognitive development should be considered in children. Therefore, the importance of the remaining thyroid tissue volume after partial thyroidectomies has been discussed for thyroid functions. It has been reported that in the absence of goiter, nodules, and positive thyroid antibodies, hormone replacement is not necessary until the TSH level is 5-10 IU/L. Minimum of 7.3 ml of tissue might be enough for everyday functions. So, if there will be less than 10 ml of thyroid tissue after surgery, thyroid hormone functions should be followed carefully.[9] Complications other than hypothyroidism after partial excision in children may occur. These possible complications are recurrent laryngeal nerve damage, hematoma, and hypoparathyroidism.[9]

Total thyroidectomy is increasingly preferred in benign diseases, especially those who do not benefit from long-term treatments.[1]

Malign Thyroid Nodules

The prognosis of malignant tumors is excellent in childhood.[4] However, rare occasions may cause fatal neoplasms in children.[4] Tumors in children are usually and paradoxically larger.[14] Also, lymph and lung metastases are more detected in children than adults.[14] Genetic factors, immunity disorders, peritumoral fibrosis, angiogenic reactions, body responses to ionizing radiation, late diagnosis, and unknown causes are some of the main reasons for this difference.[4,14] High dependency on Thyroid Stimulating Hormone (TSH) in children has also been attributed to childhood predisposition.[14]

With the introduction of FNAB, the rate of thyroid surgeries has decreased to 25-50%.[12] The specificity of FNAB in children is between 65-90%.[12] However, FNAB is not much used in children because there are potential complications and may require sedation.[12] Although the patient's characteristics may be helpful in the choice of surgery, the histological evaluation will be effective in the final decision.[12]

The optimal surgical treatment of malignant thyroid diseases is not yet precise.[4,18] In the study by Podda et al.[15,27] of 36 patients with thyroid cancer had a total thyroidectomy, and 9 had hemithyroidectomy. In the same study, four total thyroidectomy treatments were performed in two stages.[15]

In another study, it was stated that 7 of 26 malignant patients underwent total thyroidectomy, and 19 of them had a subtotal thyroidectomy. Although the authors performed mostly subtotal thyroidectomy in this study, they concluded that total thyroidectomy appears to be the most appropriate treatment. Total excision is due to the possibility of a tumor in the contralateral thyroid lobe.[5] Other studies report different opinions on malignant tumors' Hemi- or total

thyroidectomies[4,13,15] Insisting on subtotal thyroidectomy is an excellent postoperative result in malignant conditions. Some authors also find that subtotal excision is more appropriate for preventing hypoparathyroidism.[5]

An advantage of total thyroidectomy is radioiodine ablation therapy after surgery. By using radioiodine therapy, the possibility of recurrence in the thyroid bed according to the development of the tumor or the nodule involvement will be reduced.[5,18]

As different studies demonstrated variable recurrence rates between 22% and 49%, it can be easily understood that there are significant differences in treatment modalities. Clinical tumor detection in cervical lymph nodes in 29% of the cases and then finding tumor cells in 73% of cases is another strong evidence for the different recurrence rates in different studies.[14]

Follicular Adenoma and Carcinoma

A follicular adenoma is a particular form of thyroidal malignancy for children. There are not enough studies in the literature on follicular tumors in pediatric patients.[13] In addition, diagnosis of follicular adenoma with FNAB usually remains in the "gray zone." As follicular adenoma is very similar to Hashimoto's thyroiditis, nodular hyperplasia, or Hurtle cell adenoma, differential diagnosis can be confusing. There is a 20-30% chance of defining malignancy because of needle biopsy in all these circumstances. The differences among these diseases can be efficiently made by surgical excision and examination of the entire nodule.[12]

Spinelli et al.'s[13] study reported no recurrence with partial thyroidectomy in the follow-up of the remaining thyroid tissues of patients with follicular carcinoma. In their series, follow-up processes of 90% of follicular carcinomas in children are unproblematic. To succeed in an effective postoperative period, Spinelli et al.[13] stated that size, localization, multifocality, lymph node metastasis, and extrathyroidal extension should be demonstrated by precise ultrasonography evaluation. Some authors advocated that those tumors smaller than 4 cm without extra-thyroid extension could be followed up after conservative surgery. Total thyroidectomy is recommended if the tumor spreads over 3 cm.[13] In another study, experts preferred total thyroidectomy in the presence of lesions larger than 1 cm.[4] Despite these significantly different opinions, the difficulty of conducting a prospective study makes it hard to make a definitive decision.[2]

CONCLUSION

If well-differentiated thyroid cancers are detected, surgical methods other than total thyroidectomy may be preferred. However, total and near-total surgeries can be performed for widely invasive carcinoma with central lymph node dissection. Completion of thyroidectomy and radioiodine ablation therapy reduces recurrence and mortality by removing microscopic residuals. Nevertheless, despite appropriate surgical treatment, relapses can occur even after a long time.

Surgical complications may be more likely in children than adults. However, in the case of a disease requiring thyroid surgery, total thyroidectomy may be preferred over other methods, or at least with a few stages. If thyroidectomy is performed other than total excision, the treatment should be managed by predicting that the procedure can be transformed into total thyroidectomy.

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Referee Evaluation Process

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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Congenital cystic diseases of the lung

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ABSTRACT

Congenital cystic diseases of the lung are rare but their incidence is increasing, especially with the widespread use of antenatal ultrasound. Close relationships between airway and respiratory segments and vascular structures during embryonic development can lead to malformations. It should be remembered that congenital cystic lung diseases have the potential to be life-threatening and the possibility of missed diagnosis is high. Surgical resection yields good results in symptomatic lesions, with lobectomy being the most commonly performed surgical approach. Some centers recommend surgical resection even in asymptomatic patients to prevent infection and exclude malignancy.

Keywords: Lung, congenital cystic diseases, antenatal ultrasound

INTRODUCTION

Although congenital cystic lesions of the lung are rare in children, their incidence is increasing with the widespread use of antenatal ultrasound.[1,2] Intrapulmonary structures consist of closely related airways and respiratory segments, which are associated with arterial, venous, and lymphatic vessels. These are complex structures that can undergo changes during embryonic development and lead to pulmonary malformations.[3] These diseases often share common etiological mechanisms and histopathological features, thought to arise from disrupted interaction between embryological mesodermal and ectodermal lung components during development.[1,2] The terminology and classification of cystic lung malformations have long been debated. Descriptions used for clinical diagnosis are generally based solely on imaging studies.[4,5] As understanding of the developmental and genetic origins of these disorders evolves, terminology and classifications are also revised.[2]

The likelihood of missing the diagnosis of congenital cystic lung diseases is high unless kept in mind and investigated with advanced imaging studies.[6] Congenital cystic lung diseases carry the potential to be life-threatening and require urgent diagnostic evaluation.[7] While the size of most lesions tends to decrease towards the end of pregnancy and may be asymptomatic at birth, the majority of these patients still exhibit abnormal postnatal CT findings.[8] Furthermore, these lesions have been reported to be responsible for fetal demise, severe respiratory distress in the neonatal period, and recurrent lung infections, and may even serve as precursors to malignant lesions.[3] However, the risk of malignancy in this population has not been fully defined.[8]

There is consensus on the necessity of surgical resection in symptomatic lesions; however, opinions are divided between surgical and more conservative approaches in clinically silent cases.[9] Some centers advocate for a watchful waiting non-surgical management, while others recommend surgical resection of the involved lung lobe to prevent infection and exclude malignancy.[8,10]

It has been suggested that early surgery (<6 months) may facilitate easier surgical intervention, shorter recovery time, potential compensatory lung growth, and potentially fewer complications.[11] Lobectomy is currently the most commonly performed surgical approach.[12]

BRONCHOGENIC CYST

Bronchogenic cysts are typically single, unilocular cysts filled with fluid or mucus and devoid of septations. In the presence of recurrent infection or bleeding, the content may become purulent or bloody.[2,13]

Bronchogenic cysts arise from abnormal budding of the endoderm of the foregut where the respiratory tract and upper gastrointestinal system develop. They are most commonly found in the mediastinum around the tracheal bifurcation, but can also occur in various locations within or outside the thorax (Figure 1). Unless complicated by secondary infection, which is more commonly seen in intraparenchymal cysts, they do not communicate with the normal tracheobronchial treer.[2,14]

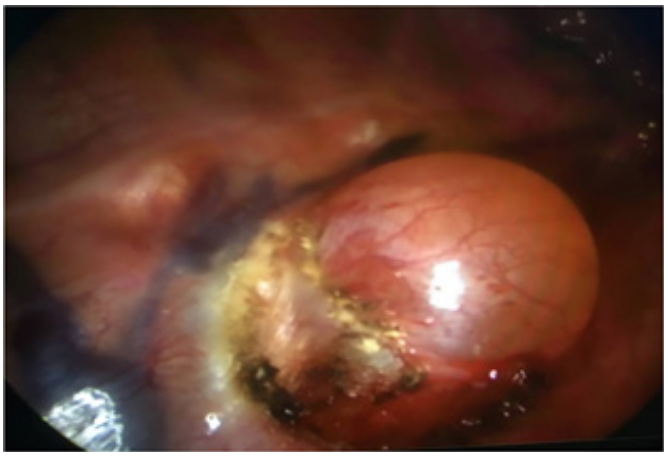

Figure 1. Bronchogenic cyst located in the right posterior mediastinum, within the superior vena cava (filled with purulent fluid)

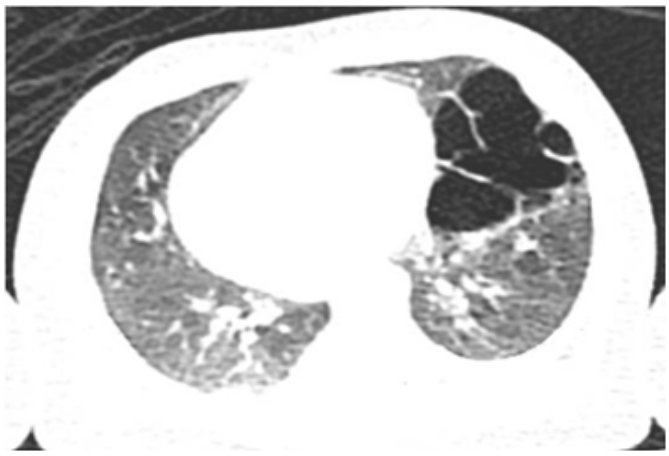

Figure 2. Congenital pulmonary airway malformation characterized by multiple cystic areas in the left lung in a newborn

In children, respiratory distress, dyspnea, recurrent pneumonia, lobar emphysema, or bleeding may occur due to infection of the cyst or mass effect caused by the cyst. The differential diagnosis list is extensive and includes pathologies such as pericardial cyst, cystic hygroma/lymphangioma, neuroenteric cyst, esophageal duplication cyst, and thymic cyst. When a bronchogenic cyst becomes complicated by infection or bleeding, it may be misdiagnosed as a simple abscess, pulmonary mass, pulmonary sequestration, or metastasis, making the diagnosis more challenging.[13]

Rarely, reports have been found of rhabdomyosarcoma, pulmonary blastoma, and malignant mesenchymoma in resected bronchogenic cysts in both children and adults.[15] Therefore, accurate diagnosis of bronchogenic cysts is important because missing the diagnosis can lead to serious complications.[13]

The treatment of bronchogenic cysts consists of complete surgical resection, enucleation, or lobectomy due to the risk of complications and malignant transformation. The use of video-assisted thoracoscopic surgery (VATS) is the preferred method for the treatment of bronchogenic cysts.[16]

CONGENITAL PULMONARY AIRWAY MALFORMATION

Congenital pulmonary airway malformation (CPAM), previously referred to as congenital cystic adenomatoid malformation, is the most common malformation of the lower respiratory tract.[2] CPAM is characterized by multiple cystic areas formed by excessive proliferation and dilation of terminal respiratory bronchioles, in the absence of normal alveoli (Figure 2). CPAMs are intrapulmonary lesions lined with various types of epithelial structures, maintaining communication with the normal tracheobronchial tree and preserving normal blood flow.[13] They are typically solitary and unilateral, with involvement of the lower lobe being common.[6,13] Nearly all CPAMs are detected on antenatal ultrasound.[17]

CPAM arises from an embryonic influence leading to abnormal development of terminal bronchioles. Typically, in most cases, a non-functional cystic portion of abnormal lung tissue replaces an entire lobe of the lung.[6]

The Stocker classification categorizes resected cysts into 5 categories based on the size and epithelial structure of the cyst: Type 0: involving all lung lobes and incompatible with life, Type 1: containing pseudostratified columnar epithelium, single or multiple cysts larger than 2 cm, Type 2: containing cuboidal or columnar epithelium, single or multiple cysts smaller than 2 cm, Type 3: primarily solid lesions containing cuboidal epithelium, approximately 0.5 cm cysts, Type 4: large air-filled cysts containing flattened epithelial cells.[13,18]

The prognosis of fetuses with CPAM is generally good; however, in rare cases, a cystic mass may compress normal lung and heart, posing a threat to the fetus's life.[6] Close monitoring with serial prenatal ultrasounds is necessary to determine the size, location, volume, blood flow, and fetal harm caused by the lesion.[13] Postnatally, the sensitivity of chest X-ray to detect CPAM is low, and usually computed tomography (CT) or magnetic resonance imaging (MRI) is required.[13,19]

The management of asymptomatic infants with CPAM remains controversial, although classical indications for resection are associated with respiratory tract infections and the risk of malignant transformation.[20] Delaying excision until the child becomes symptomatic has been shown to increase morbidity.[21] Additionally, follow-up X-rays or CT scans will increase the risk of radiation-related malignancy.[13] Early surgery is technically easier and reduces the risk of infection and the need for respiratory support. Therefore, the recommended timing for surgery is between 3 and 6 months, as the procedure is well tolerated, the risk of infection is lower, and it allows more time for compensatory lung growth.[19] With technological advancements in minimally invasive surgery, congenital lung lesions are now commonly removed with video-assisted thoracoscopic surgery (VATS).[22]

PULMONARY SEQUESTRATION

Pulmonary sequestrations (PS) are isolated portions of the lung separated from adjacent lung tissues. They have no connection with the bronchial tree and receive their blood supply from a systemic artery, with venous drainage to either the pulmonary or systemic vein.[13] PS is the second most common lung lesion in the spectrum of congenital lung malformations. PS is classified as intralobar (75%) and extralobar (25%) and tends to occur in the lower lobes of the lungs.[20]

PS likely occurs during very early embryonic development, possibly before the separation of the pulmonary and aortic circulations.[23]

Extralobar sequestration is often asymptomatic and incidentally detected posterior to the costophrenic angle.[1] It resembles an accessory lobe, located outside the visceral pleura of the lung and surrounded by its own pleura, regardless of whether it has a connection with the gastrointestinal system.[2] Hence, there is an anatomical boundary between it and the surrounding lung tissue.[13] While they more commonly occur in the thoracic cavity, infradiaphragmatic locations are not uncommon. They contain a vascular pedicle comprising systemic artery and drainage vein.[2] In postnatal period, children with PS may present with chronic cough, recurrent chest infections, feeding difficulties, or abdominal pain. Sixty percent of cases have another developmental anomaly, with congenital diaphragmatic hernia being the most common accompanying anomaly, along with others such as lung hypoplasia, congenital cystic adenomatoid malformation, congenital lobar emphysema, and bronchogenic cysts. There are also numerous associated cardiac malformations including dextrocardia, truncus arteriosus, and total anomalous pulmonary venous drainage. In 75% of cases, arterial blood supply is provided from the thoracic or abdominal aorta, but arterial supply can also arise from subclavian, intercostal, phrenic, internal thoracic, celiac trunk, or gastric arteries.[13,24]

Intralobar sequestration is typically localized in the posterobasal region of the lower lobe.[25] It may resemble a small cystic CPAM containing mucus-filled dilated airways and an atretic bronchus in the proximal portion of the lesion. Distinguishing intralobar sequestration from small cystic CPAM is achieved by identifying systemic arterial blood supply. When infected, intralobar sequestration can be mistaken for chronic pneumonia. Suspect intralobar sequestration in children or young adults with recurrent lower lobe pneumonia. Unlike sequestration, pneumonia has a bronchial connection with the involved lung.[2] Rarely, in the neonatal period, intralobar sequestration may present with respiratory distress secondary to congestive heart failure.[1]

Identifying abnormal systemic blood flow radiographically and surgically is a defining feature for both types of sequestration.[2] Vascular mapping during investigation of pulmonary sequestration is crucial. Doppler ultrasound, CT, and MRI are the main methods used; however, each has its advantages and disadvantages.[13]

Surgical resection involving segmentectomy or lobectomy is performed in children presenting with chronic complaints related to pulmonary sequestration. However, the treatment of asymptomatic patients with pulmonary sequestration is controversial; some prefer resection of the lesion due to the risk of bleeding and infection instead of conservative treatment.[13]

CONGENITAL LOBAR EMPHYSEMA

Congenital lobar emphysema is defined as hyperinflation of one or more lung lobes leading to compression of surrounding structures. This compression can cause mediastinal shift. The most commonly affected lobes are the left upper and right middle lobes (Figure 3).[13] While the etiology of congenital lobar emphysema is uncertain in half of cases, it can be attributed to intrinsic factors such as bronchial stenosis, bronchomalacia, mucosal proliferation, and vascular, lymph node, and adjacent lung compression as extrinsic factors.[20,26] A possible etiology could be a cartilage defect weakening the bronchus, leading to collapse on expiration and subsequent trapping of air causing hyperinflation.[27]

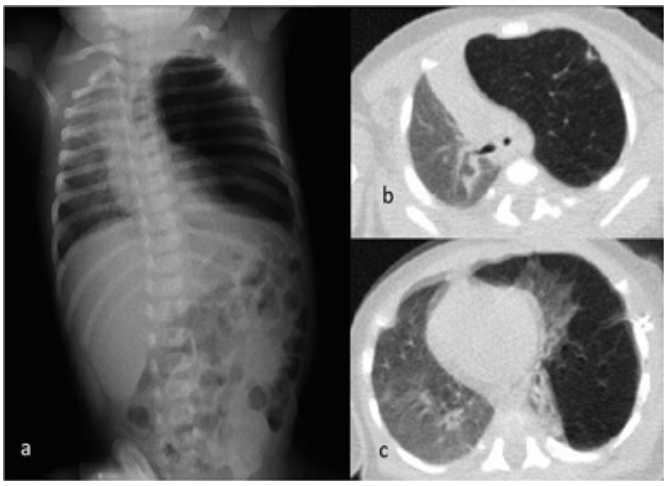

Figure 3. Mediastinal shift due to congenital lobar emphysema in the left upper lobe (a, b) and atelectasis in the left lower lobe (c)

Evaluation of associated anomalies is necessary due to the presence of associated congenital heart disease in 14% of cases of congenital lobar emphysema.[1] Additionally, distinguishing acute reversible lobar emphysema from serious irreversible lesions is important.[27]

Children may present with neonatal respiratory distress, tension pneumothorax, wheezing, or atelectasis due to lung compression, or may be asymptomatic. Chest X-ray is often diagnostic, but confirmation is usually done with CT.[6,13] Echocardiography or MRI may be needed to determine the cause of respiratory distress. Care should be taken not to misinterpret chest X-rays as pneumothorax.[13]

Treatment of children with congenital lobar emphysema consists of treating the underlying mechanism. Symptomatic cases are treated with lobectomy, while asymptomatic or mildly symptomatic patients can be managed conservatively.[6,13]

CONCLUSION

Congenital cystic diseases of the lung are rare, but their incidence is increasing, especially with the widespread use of antenatal ultrasound. Some centers recommend surgical resection even in asymptomatic patients to prevent infection and exclude malignancy. Surgical resection gives good results in symptomatic lesions and lobectomy is the most common surgical approach. It should be kept in mind that congenital cystic lung diseases have the potential to be life-threatening and the diagnosis is highly likely to be missed. Early diagnosis and treatment are important.

ETHICAL DECLARATIONS

Referee Evaluation Process

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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MHA MEDIHEALTH ACADEMY

Surgery on Children

Review

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Pediatric otitis media with effusion: current surgical approach

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ABSTRACT

Serous otitis media, which can be defined as fluid accumulation in the middle ear cavity, is one of the common conditions in school-age children. There is hearing loss that begins without causing acute pain and without symptoms. It is also a silent problem associated with school failure and attention deficit disorder. Diagnosis is usually made when hearing loss is noticed at home or at school and during the check-ups of children with adenoid vegetation complaints. Approximately 90% of preschool children experience EOM, with an average of 4 episodes per year. There are 3 main factors in the etiology of EOM; impaired ventilation of the middle ear, infection and inflammation. Treatment of EOM is a combination of observation, medical and surgical therapies. The goals of treatment are to clear the middle ear fluid and restore normal middle ear pressure and hearing. In surgical treatment, myringotomy and tympanostomy tube placement are the main approaches. Shepard Grommet type temporary tube application is the most commonly used material. The current version of the "Tympanostomy Tubes in Children" guideline published by the American Academy of Otolaryngology-Head and Neck Surgery Foundation (AAO-HNSF) in 2013 was renewed in 2022. The purpose of this mini review is to evaluate the indications for surgical treatment of EOM-tympanostomy tube application with this guideline.

Keywords: Serous otitis media, otitis media with effusion, surgical approach in otitis media

INTRODUCTION

Otitis media with effusion (EOM), also called serous otitis media, is defined as the presence of fluid in the middle ear without signs of acute infection.[1] EOM is a very common childhood disease. Up to 90% of preschool children experience EOM, with an average of 4 episodes per year.[2] Generally, EOM has its first peak around the age of 2 years, with a second peak at the age of 5-6 years, and EOM has been observed in one in 8 children in this age group.[3,4]

ETIOLOGY

There are 3 main factors in the etiology of otitis media with effusion (EOM); impaired ventilation of the middle ear, infection and inflammation.[2-5]

Middle Ear Ventilation Disorder

The Eustachian tube plays an important role in the ventilation of the middle ear. Eustachian tubes of children have an angle of 10 degrees with respect to the horizontal plane, while this angle increases to 45 degrees in adults. The length is shorter in children compared to adults and the mouth of the Eustachian tube may be blocked due to adenoid hypertrophy or adenoiditis in children, causing otitis media. For these reasons, Eustachian tube dysfunction is more common in children.[2-4]

Infection

EOM often occurs after acute otitis media (AOM), but conditions such as upper respiratory tract infections (URTI), rhinosinusitis, adenoiditis, etc. can cause edema and lymphoid hyperplasia in the nasopharynx, leading to the formation of EOM. Frequent viral URTIs may alter the bacterial colony of the nasopharynx by causing an increase in nasopharyngeal secretions.[2-4]

Inflammation

Neurogenic inflammation has been thought to play an important role in the multifactorial etiology of EOM. In studies, increased levels of Substance P and increased levels of Vasoactive Intestinal Peptide have been observed in effusion samples obtained from the middle ear in patients with EOM compared to other body fluids.[3] Some publications have also shown that children with allergic rhinitis have EOM more frequently than the normal population.[4] It has also been associated with pepsin substance in the theory related to gastroesophageal reflux.[5]

In general, EOM is a self-resolving condition and careful observation is the preferred strategy, except in children with hearing impairment, developmental delay and certain conditions (such as cleft palate) that need to be addressed.

Recurrent episodes may occur in approximately 40-50% of children. There is usually a tendency for improvement within 4-6 weeks. Some children develop chronic EOM, defined as EOM lasting 3 months or longer. Eustachian tube dysfunction, which rarely results in EOM, persists for years and may cause retraction pockets in the tympanic membrane, ossicular chain erosion, tympanic membrane perforation or cholesteatoma.[6]

RISK FACTORS

- Pacifier use
- Tobacco use by parents
- Low socioeconomic status
- Premature birth
- Gastroesophageal reflux disease
- History of allergy

To reduce the risk, breastfeeding can be encouraged, chewing gum can be recommended, and bottle feeding on the back should be avoided.[7]

CLINICAL FINDINGS AND DIAGNOSIS

Acute EOM refers to a period of less than 3 weeks and chronic EOM refers to a period of more than 3 months. The period between 3 weeks and 3 months can be defined as subacute EOM. Recurrent EOM is defined as 3 or more episodes within 6 months or 4 or more episodes per year. EOM can be found in routine screening of asymptomatic children. Hearing loss as a symptom is rare in children. It is often detected when children are brought to the doctor because their parents suspect hearing loss. It is one of the causes to be considered in cases of poor school performance, learning difficulties and delayed speech. EOM can also have negative effects on balance. In children, it can cause clumsiness and an increased tendency to bump into things.[8]

The child with EOM is evaluated using otoscopy, audiometry and tympanometry. Otoscopic images may show opacification of the tympanic membrane, inability to see the Pulitzer light triangle, bulging of the membrane and air fluid level behind the membrane (Figure 1). Radial vascularity can be observed on the tympanic membrane.[8,9]

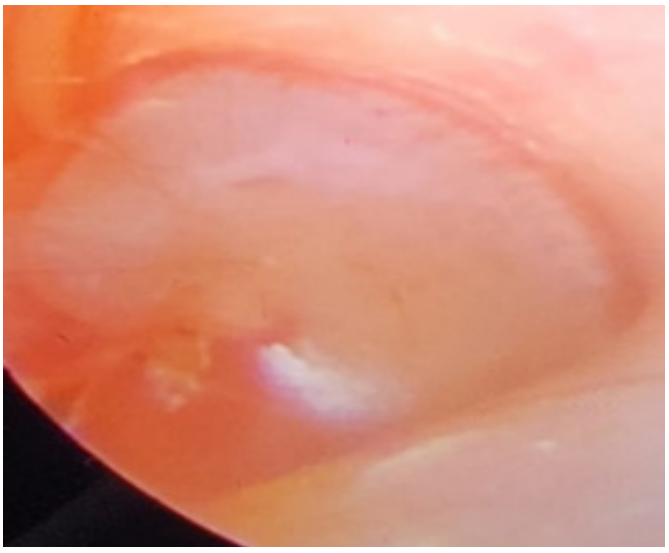

Figure 1. Otoscopic image of EOM

Tympanometry is used to measure the tympanic membrane compliance by placing a probe in the external auditory canal and sending sound waves into the canal. In EOM, the fluid in the middle ear absorbs sound and causes the formation of a straight line. This finding is also seen when the tympanic membrane is perforated and is called type B tympanogram. Type A is seen with normal ear ventilation, while type C indicates negative middle ear pressure caused by eustachian tube dysfunction (Figure 2).[4,9,10]

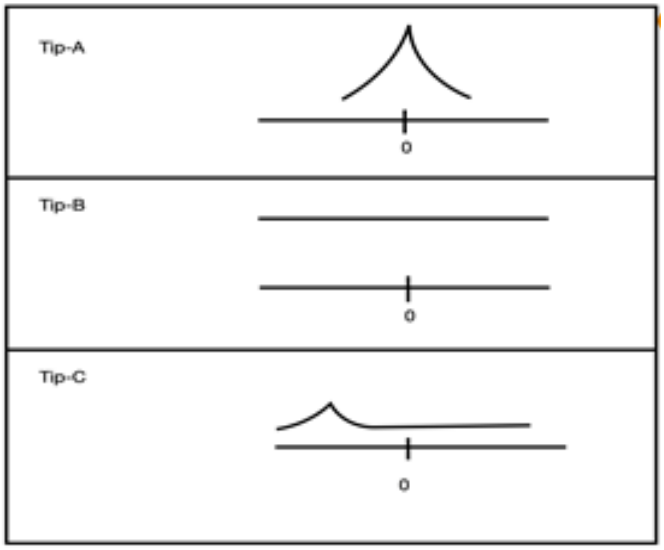

Figure 2. View of tympanogram results

EOM causes an average hearing loss of 20-28 dB. Although it rarely exceeds 50 dB, in 20% it is above 35 dB and these hearing losses are conductive.[9] EOM, which has a fluctuating course, is very common in children under 2 years of age. Left untreated, it can cause membrane changes such as tympanosclerosis, attic retraction pocket, atelectasis, and atrophy of the tympanic membrane.[4,8-10]

TREATMENT

Treatment of EOM is a combination of observation, medical and surgical therapies. The goals of treatment are to clear middle ear fluid and restore normal middle ear pressure and hearing. It has been observed that 50% of children with close follow-up return to normal after 3 months.

Medical Treatment

The first step in medical treatment of EOM due to AOM is antibiotics and the duration of treatment is 10 days. If treatment is not successful, there is no benefit in extending the duration or changing antibiotic groups. It is not useful to give antibiotics to patients who are asymptomatic during viral infections and progress subclinically. The antibiotherapy to be started is amoxicillin or amoxicillin-clavunate.[11]

Although oral glucocorticoids may accelerate short-term resolution of EOM, improvement in hearing and functional status has not been proven. Intranasal glucocorticoids are not recommended unless necessary for the treatment of underlying allergy/chronic rhinitis.[10] Antihistamines and decongestants are also not recommended.[11] There is no evidence that autoventilation alone is effective in treatment and should not be recommended for children with active nasal discharge.[12]

Surgical Treatment

Myringotomy and tympanostomy tube placement are the main approaches in surgical treatment. Over time, myringotomy alone has been shown to be ineffective and is no longer practiced in most clinics. There are some methods that provide middle ear ventilation such as balloon dilatation method for Eustachian tube dysfunction. However, the most effective and easiest way is tympanostomy tube placement. The type of tube that can be applied is decided according to the patient's clinic. Shepard Grommet type temporary tube is the most commonly used material. It is the most commonly applied material in children with otitis media with effusion who will remain in routine follow-up, and is disposed of in the external auditory canal with foreign body reaction within 6-12 months. T-type tympanostomy tubes are long-term-permanent type tubes. They are used in patients with persistent effusion, chronic otitis media or nasopharyngeal cancer patients (Figure 3).[4,10-16]

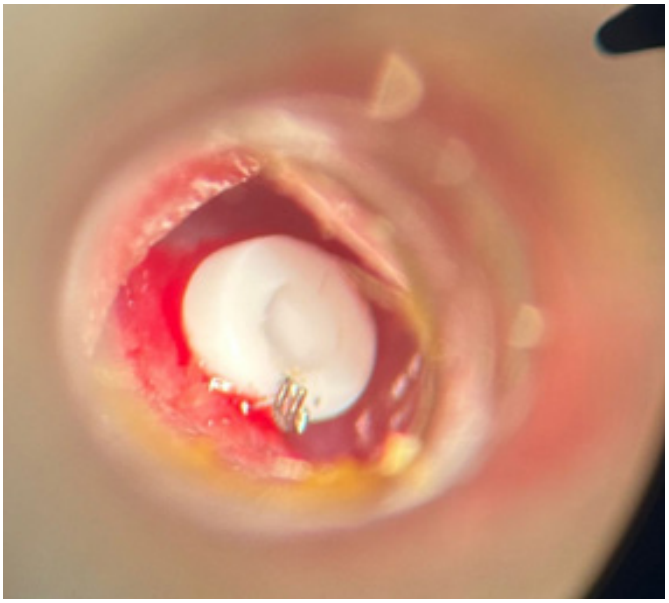

Figure 3. Shepard Grommet ventilation tube application-microscopic view

Tympanostomy tube placement: Tympanostomy tube placement is the most common outpatient surgery performed in children. In 2006, a study conducted in the United States showed that 667,000 children under 15 years of age underwent tympanostomy tube placement, accounting for 20% of all surgical interventions in this age group.[13] Another study showed that this number of tympanostomy tube surgeries decreased by 30% due to the effect of pneumococcal vaccination.[14-18] We know that *Streptococcus pneumoniaeis* the most common causative agent of bacterial rhinosinusitis and acute otitis. This agent is also isolated from serous otitis media.

The clinical practice guideline for tympanostomy tubes to be applied in pediatric patients was published in 2022 by Rosenfeld et al.[18] as an updated version of the "Tympanostomy Tubes in Children" guideline published in 2013 by the American Academy of Otolaryngology-Head and Neck Surgery Foundation (AAO-HNSF). The guideline was written by reviewing 6 major clinical practice guidelines, 18 systematic reviews and 27 randomized controlled trials.[15-17]

If we summarize the articles of the guideline[4,10-16]

1. In short-term EOM, a tube should not be placed in children with a single episode less than 3 months from the date of onset or, if the onset date is unknown, from the date of diagnosis.

2. If EOM persists for 3 months or more, or if the child is a candidate for tubing, a hearing evaluation should be obtained. Hearing test values up to 15 decibels are considered normal.

3. Bilateral tympanostomy tubes are recommended for children with documented hearing loss and bilateral chronic EOM.

4. Children with unilateral or bilateral chronic EOM who otherwise have symptoms that are wholly or partially attributable to EOM may have a tympanostomy tube. These symptoms include balance problems, school failure, ear discomfort, behavioral problems or poor quality of life.

5. Children with chronic EOM who do not have a tympanostomy tube should be re-evaluated at 3-6 month intervals until the effusion has disappeared and hearing loss indicates structural abnormalities of the tympanic membrane or middle ear.

6. Children with recurrent AOM without middle ear effusion should not be intubated.

7. Bilateral tubing is recommended in children with recurrent AOM in the presence of middle ear effusion, even in the presence of unilateral findings.

8. In children with EOM, tubing may be performed when a type-B tympanogram or documented effusion is expected to last longer than 3 months.

9. Long-term tubes (T-tube) are not recommended for children who meet the criteria for tube placement unless there is a specific reason based on the expectation of long-term middle ear ventilation.

10. Adenoidectomy may be performed in addition to tube placement in children with symptoms directly related to adenoid hypertrophy or in children over 4 years of age.

11. In the preoperative period, clinicians should educate the children's caregivers about tube function, follow-up schedule and detection of complications.

12. Antibiotic ear drops should not be routinely prescribed after tympanostomy tube placement.

13. The child's ears should be examined within 3 months of tube insertion and families should be informed about the need for routine follow-up until the tubes are removed.

The group of children at risk in the guidelines:

- Permanent hearing loss independent of EOM
- Suspected or proven speech and language development disorder
- Autism spectrum disorder
- Syndromes or craniofacial disorders involving cognitive speech or language delays
- Uncorrectable visual impairment or blindness
- Cleft palate independent of concomitant syndromes

- Developmental delay
- Mental retardation, attention deficit/hyperactivity disorder, learning disabilities

CONCLUSION

Hearing loss as a symptom in children is rare, but if hearing loss is present, one of the most common causes is serous otitis media. Serous otitis media is most often detected when children are taken to the doctor because parents suspect hearing loss. Serous otitis media is one of the reasons that should be kept in mind in cases of low school performance, learning difficulties and speech delay. A large patient population is also diagnosed during hearing screenings conducted in schools. Treatment ; consists of a combination of observation, medical, and surgical treatments; The aim is to clear middle ear fluid and restore normal middle ear pressure and hearing. Early diagnosis and treatment is important.

ETHICAL DECLARATIONS

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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MHA MEDIHEALTH ACADEMY

Surgery on Children

Letter to Editor

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Diffuse alveolar hemorrhage

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Dear Editor,

Diffuse alveolar hemorrhage (DAH) is a pathology that occurs following the accumulation of intraalveolar erythrocytes originating from the vascular structure of the alveoli. In the pathogenesis of DAH, there is an injury in the alveolar microcirculation. Common clinical signs and symptoms include hemoptysis, anemia, widespread radiographic pulmonary infiltrates, and severe hypoxemic respiratory failure. Etiologies of DAH include immune causes (such as ANCA-associated vasculitis, isolated pulmonary capillaritis, connective tissue diseases, anti-glomerular basement membrane disease, anti-phospholipid antibody syndrome, Behçet's disease) as well as non-immune causes like cardiac diseases, coagulation disorders, infections, and opioid use. Studies suggest that sevoflurane, commonly used by anaesthesiologists during surgical procedures, may also play a role in the etiology of DAH.

Sevoflurane is an inhaled anaesthetic agent used for the induction of general anesthesia. Inhaled agents during general anesthesia cause high mechanical stress, leading to DAH under certain conditions. Consequently, gas exposure can increase alveolar permeability, and oxidative stress, and enhance inflammatory response. It is also thought that sevoflurane activates these pathways through a similar mechanism, and there are limited reported cases in the literature regarding the development of DAH associated with the use of this matter.[1] In a case of acute appendicitis diagnosed during adolescence, we performed a surgical intervention, and the patient developed hemoptysis, dyspnea, and tachycardia within the second hour post-operation. After evaluation by a pulmonologist and an anaesthesiologist, the patient underwent necessary tests and was diagnosed with DAH based on clinical presentation. The patient denied any tobacco or recreational drug use and had no known medical conditions. Following admission to the intensive care unit of the department of anaesthesiology and reanimation, the patient received non-invasive mechanical ventilator support, high-dose corticosteroids, and antibiotic therapy. Symptoms improved by the third day of hospitalization, and the patient was discharged after two days of follow-up in the pediatric surgery service.

We believe that sevoflurane is implicated in the development of DAH. Additionally, considering the increasing prevalence of recreational substance use such as tobacco and marijuana during adolescence, we recommend a detailed preoperative assessment of etiological factors for DAH.

ETHICAL DECLARATIONS

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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