The Prevalence of Adenoid Hypertrophy in Brain MRI Examination in Children with Headache in the Pediatric Neurology Outpatient Clinic

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Abstract

Objectives: This study aims to evaluate the frequency of adenoid hypertrophy with magnetic resonance imaging in children and adolescents admitted to the pediatric neurology outpatient clinic with headaches. Materials and Methods Medical files of 772 children and adolescents aged 3-18 years who were admitted to Başkent University Pediatric Neurology Outpatient Clinic between 2012-2020 with headaches were retrospectively analyzed. Patients' age at presentation, age of onset of headache, duration, frequency, severity, localization-character of pain, nasal congestion, mouth breathing, snoring, cough, rhinorrhea, nasal discharge, presence of an allergy, and initial brain MRI reports were recorded, brain MRI examination was re-examined by a single radiologist to evaluate radiologically the presence of adenoid hypertrophy. Results A total of 761 (414 F) children and adolescents who were undergoing brain magnetic resonance imaging in the Radiology Department of Başkent University Faculty of Medicine were included in the study. No note of sleep disturbance or adenoid hypertrophy clinical signs and symptoms were found in patient files. Further, interestingly, there was no note on incidentally detected adenoids in the initial brain magnetic resonance (MR) imaging reports. When the imaging of the patients was re-evaluated for adenoid hypertrophy, grade 3 adenoid hypertrophy was detected in 228 patients. The mean age of those with grade 3 adenoid hypertrophy was 9±2.9 Conclusion: Clinical findings of adenoid hypertrophy should be questioned in children with headaches, and the radiology specialist should be warned to include the presence of adenoid hypertrophy in the report, with or without clinical history.

Objectives

Adenotonsillar hypertrophy (AH) can lead to obstruction of the upper airway, causing different symptoms, such as habitual mouth breathing and snoring up to obstructive sleep apnea. Some symptoms, such as nasal obstruction, rhinorrhea, cough, and headache, and some disorders, including recurrent otitis, recurrent infections to the upper (URI) and lower airways (LRI), may be related to AH. In addition, allergies may also be associated to AH. This study aims to evaluate the frequency of adenoid hypertrophy with magnetic resonance imaging in children and adolescents admitted to the pediatric neurology outpatient clinic with headaches.

Materials and Methods

Medical files of 772 children and adolescents aged 3-18 years who were admitted to Başkent University Pediatric Neurology Outpatient Clinic between 2012-2020 with headaches were retrospectively analyzed. Patients' age at presentation, age of onset of headache, duration, frequency, severity, localization-character of pain, nasal congestion, mouth breathing, snoring, cough, rhinorrhea, nasal discharge, presence of an allergy, and initial brain MRI reports were recorded, brain MRI examination was re-examined by a single radiologist to evaluate radiologically the presence of adenoid hypertrophy.

In sagittal T1W sequences, by measuring the ratio of the adenoid thickness (from the pharyngeal tubercle at the skull base to the adenoid tissue end) to the distance from the pharyngeal tubercle at the skull base to the upper surface of the soft palate in the midsagittal image,

Adenoid hypertrophy graded as follows

- Grade I: Adenoid tissue filling one-third of the vertical part of the choana
- Grade II: Adenoid tissue tissue from one-third to two-thirds of the choana
- Grade III: Two-thirds to almost complete occlusion of the choana
- Grade IV: Complete choanal obstruction rated as.

Results

A total of 761 (414 F) children and adolescents who were undergoing brain magnetic resonance imaging in the Radiology Department of Başkent University Faculty of Medicine were included in the study. Information on adenoid hypertrophy symptoms such as sleeping with open mouth, snoring during sleep, and frequent awakenings and sleep disorders was not found in the file notes. It was observed that the archive brain MRI reports of the patients were recorded as normal in all patients, except for the presence of arachnoid cysts in two patients.

When the imaging of the patients was re-evaluated for adenoid hypertrophy, grade 3 adenoid hypertrophy was detected in 228 patients. The mean age of those with grade 3 adenoid hypertrophy was 9±2.9 years.

Demographic characteristics of the study group, headache characteristics and adenoid hypertrophy degrees in brain MRI evaluated for the second time are given in Table 1.

Table 1. Brain MRI findings, clinical and demographic characteristics of patients presenting with headache

	Adenoid hypertrophy								
	Grade I (n=147)		Grade II (n=386)		Grade III (n=228)		Total (n=761)		
	N	%	N	%	n	%	n	%	p
GENDER									
F	98	66,7	209	54,1	107	46,9	414	54,4	0,001
M	49	33,3	177	45,9	121	53,1	347	45,6	
AGE									
<6	6	4,1	27	7,0	46	20,2	80	10,5	
6-12	54	37,0	213	55,2	147	64,5	414	54,4	0,0001
>12	86	58,9	146	37,8	35	15,4	267	35,1	
Interval of time the onset of headache									
<3 ay	73	50,0	185	48,1	110	48,2	368	48,5	0,919
>3 ay	73	50,0	200	51,9	118	51,8	391	51,5	
Frequency									
Unknown	44	29,9	122	31,6	54	23,7	220	28,9	
Daily	41	27,9	92	23,8	62	27,2	195	25,6	
1/week	4	2,7	25	6,5	17	7,5	46	6,0	
1/ Month	4	2,7	13	3,4	12	5,3	29	3,8	0,523
2/ Month	8	5,4	21	5,4	9	3,9	38	5,0	
>2 /Month	41	27,9	100	25,9	67	29,4	208	27,3	
4/Year	5	3,4	13	3,4	7	3,1	25	3,3	
Localization									
Unknown	53	36,1	143	37,0	82	36,0	278	36,5	
Frontal	67	45,6	179	46,4	116	50,9	362	47,6	
Occipital	12	8,2	29	7,5	12	5,3	53	7,0	0,937
Vertex	1	0,7	3	0,8	1	0,4	5	0,7	
Parietotemporal	14	9,5	32	8,3	17	7,5	63	8,3	
Headache quality									
indescribable	83	56,5	243	63,0	156	68,4	482	63,3	
Stabbing	2	1,4	5	1,3	3	1,3	10	1,3	
Throbbing	40	27,2	105	27,2	49	21,5	194	25,5	0,184
Compressing	6	4,1	15	3,9	8	3,5	29	3,8	
Sharp	16	10,9	18	4,7	12	5,3	46	6,0	
Duration									
<1 hour	57	38,8	129	33,4	74	32,5	260	34,2	
1-6 hour	18	12,2	33	8,5	26	11,4	77	10,1	0,514
>6 hour	18	12,2	65	16,8	34	14,9	117	15,4	
Variable	54	36,7	159	41,2	94	41,2	307	40,3	
Time of Onset of Pain									
Morning	23	15,8	75	19,4	45	19,7	143	18,8	
Noontime	12	8,2	29	7,5	24	10,5	65	8,6	0.736
Evening	11	7,5	22	5,7	12	5,3	45	5,9	
Any Time of Day	100	68,5	260	67,4	147	64,5	507	66,7	

Conclusion

This study was planned to focus attention on the frequency and clinical importance of comorbid adenoid hypertrophy in brain MRI examination in children with headache. It is an important study because it raises awareness among radiologists about the inclusion of comorbidities, including adenode hypertrophy, in brain MRI reports. Clinical findings of adenoid hypertrophy should be questioned in children with headaches, and the radiology specialist should be warned to include the presence of adenoid hypertrophy in the report, with or without clinical history. Patients with adenoid hypertrophy should be referred to the otolaryngology unit if necessary.