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Review on the sinonasal papilloma according to the bone thickness*

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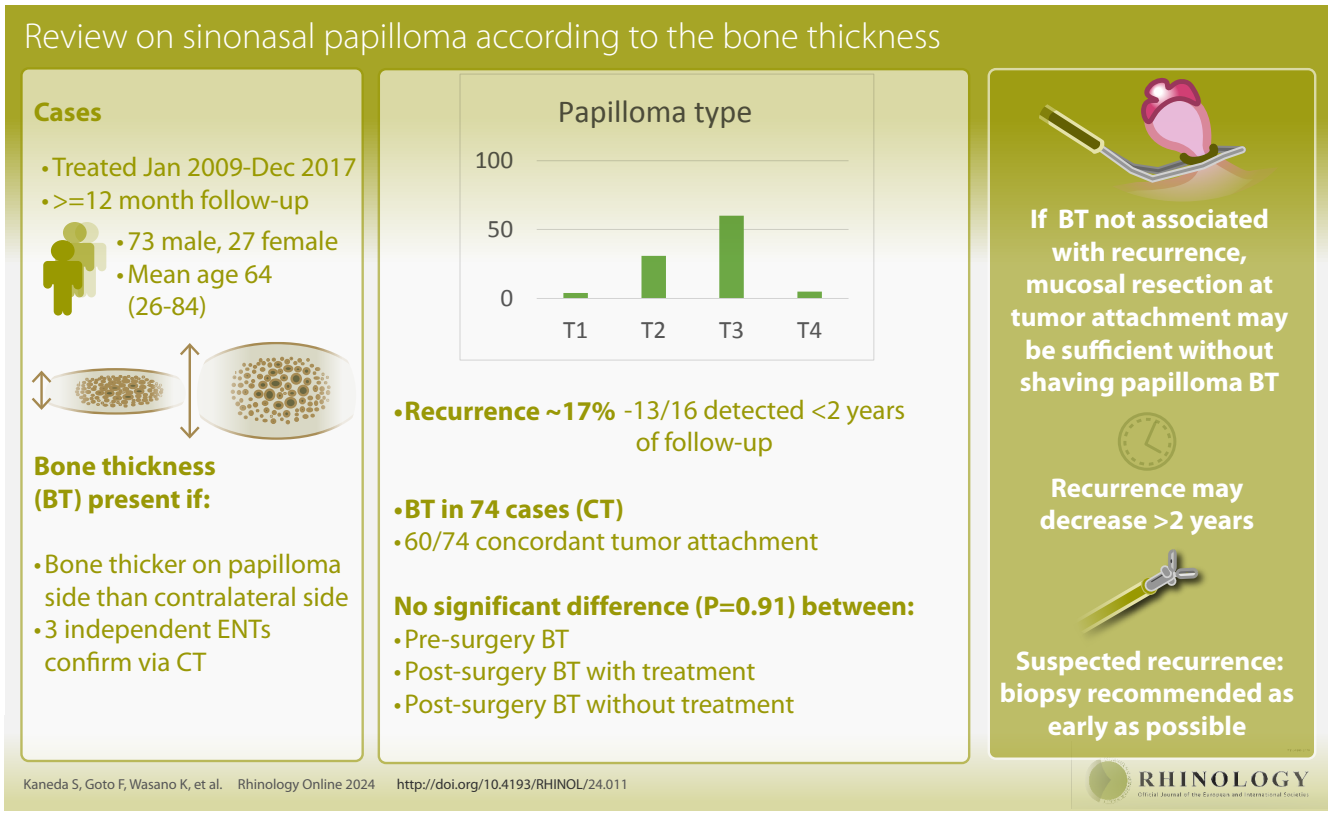
Abstract

There were no statistically significant differences between no bone thickness after surgery, bone thickness and treatment and bone thickness and no treatment. Proper resection of the mucosa at the tumour attachment could be sufficient without shaving the bone thickness of the tumour.

Key words: bone thickness, endoscopic sinus surgery, nasal papilloma, recurrence



Introduction

Sinonasal papilloma is the most frequent benign nasal and sinus tumour. The rates of recurrence range from 5% to 13.8% [1, 2]. Subperiosteal resection and drilling of the underlying bone at the papilloma origin is required to prevent postoperative recurrence [3, 4]. However, there are no published reports on the association between the recurrence and the presence of preoperative bone thickness.

Table 1. Patients' demographics and pathological types of included cases.

Category	value
Male: female	73:27
Mean age at time of surgery (range)	64 (26–84)
Primary: recurrence	65:35
Pathology Inverted P: Oncocytic P: Exophytic P: SCC in Inverted P	93: 2: 0: 5

P: papilloma, SCC: squamous cell carcinoma

Table 2. The attachment site of the papilloma.

	Recurrence	Non-recurrence	Total
Frontal sinus	2	3	5
Ethmoid sinus			
Anterior	2	32	34
Posterior	2	2	4
Maxillary sinus			
Anterior wall	0	4	4
Posterior/lateral wall	0	6	6
Superior wall	0	4	4
Inferior wall	0	3	3
Medial wall	1	7	8
Sphenoid sinus	0	0	0
Nasal cavity	1	2	3
Superior turbinate	0	3	3
Middle turbinate	3	11	14
Inferior turbinate	0	0	0
OMC	0	0	0
Uncertain or multifocal origins	4	3	7
Total	15	80	95

In this study, we investigated the long-term outcome of 100 sinonasal papilloma cases in our hospital, focusing on bone thickness by computed tomography (CT) and its treatment to determine the risk factors for postoperative recurrence.

Methods

This retrospective study included 100 sinonasal papilloma cases treated surgically at our hospital from January 2009 to December 2017. They were followed up for at least 12 months for early detection of recurrence. The presence of papilloma bone thickness was defined if the bone in the papilloma site was thicker than bone in the same place of the contralateral side by three independent otolaryngologists in CT. An agreement between at least two otorhinolaryngologists was required for bone thickness diagnosis. We checked the pre- and post-operative CT

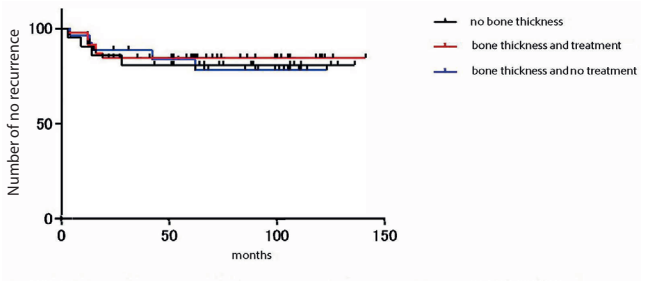


Figure 1. The Kaplan-Meier curve of tumor recurrence in the 3 groups.

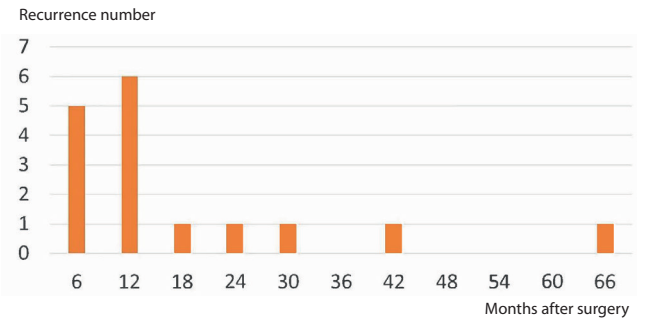


Figure 2. The recurrence number and time to recurrence. The average follow-up period of 95 cases was 66.4 months (3-141 months).

and investigated whether bone thickness and its treatment were associated with papilloma recurrence. For statistical analysis, we used the Kaplan–Meier method and Log-rank test. Values of $P < 0.05$ were considered statistically significant. All statistical analyses were conducted using the statistical software 'GraphPad Prism' (GraphPad Software).

Results

There were 73 males and 27 females with a mean age of 64 (26–84) years (Table 1). Based on the Krouse classification (5), 4 were T1 cases, 31 were T2, 60 were T3 and 5 were T4. On the Oikawa classification, T3 cases were divided into T3-A cases, where the tumour did not extend to the frontal sinus or supraorbital cellulite and T3-B cases, where the tumour extended to the frontal sinus or supraorbital cellulite [6]. Surgical methods and the site of attachment of papilloma were in Table 2.

Of the 95 cases, excluding the 5 cases in which postoperative pathology revealed a diagnosis of SCC in IP, 16 had recurrence (recurrence rate of about 17%) (Table 3). There were 74 cases with increased bone thickness in CT (Table 4). The bone thickness judged by the three independent otolaryngologists in CT and the tumour attachment during the operation were concordant in 60 of 74 cases (Table 4). We divided the bone thickness before surgery into no bone thickness after surgery, bone thickness and treatment and bone thickness and no treatment. The treatment included forceps punch, bur shaving and coagulation. There were no statistically significant differences between the three

Table 3. The recurrence rate by surgical approach and classification. Patient number (recurrence number).

	T1	T2	T3A	T3B	T4		Recurrence rate
ESS	4(0)	28(3)	11(4)	18(4)	5	61(11)	18%
ESS + EMMM		2	9(1)	1		12(1)	8%
C-L		1	11(2)	0		12(2)	17%
ESS Draflla			1(1)	3		4(1)	25%
ESS + Killian			1	3(1)		4(1)	25%
ESS+ Luc			1	0		1	0%
Denker			1			1	0%
	4	31(3)	35(8)	25(5)	5	95(16)	16%
Recurrence rate	0%	10%	23%	20%	Not included	17%	

ESS: Endoscopic sinus surgery, EMMM: Endoscopic modified medial maxillectomy, C-L: Caldwell–Luc

Table 4. The number of the bone thickness before surgery in CT and the match number between the attachment base of the tumor during surgery and the bone thickness in CT.

bone thickness before surgery			match of tumour base		
yes	no	total	match	not match	total
74	21	95	60	14	74

groups (P = 0.91) (Figure 1).

The mean time to recurrence was 17.3 months (3–62 months, median: 10 months), and the mean postoperative follow-up period was 66.4 months (3–141 months, median: 62 months). Of the 16 recurrent cases, 13 were detected in less than two years of follow-up (Figure 2).

Discussion

It is widely known that there is associated bone thickness at the attachment site of papilloma. Lee et al. reported that preoperative bone thickness and base identification were possible in 55 of 76 cases. Meanwhile, 49 of 55 papilloma cases had focal hyperostosis coinciding with the tumour base in CT [7]. The rate of focal hyperostosis at CT findings in the IP group was greater than in the chronic rhinosinusitis group [8]. In our study, bone thickness was identified in 74 of 95 cases (78%), and 60 of the 74 cases had coinciding base and actual attachment sites during surgery in CT (81%). However, there have been no previous reports examining the relationship between bone thickness and recurrence. We thought that if the residual bone thickness and its treatment were not associated with recurrence, then proper resection of the mucosa at the tumour attachment could be sufficient without shaving the bone thickness of the tumour.

In this study, we examined data, with an average follow-up period of 66.4 months, to determine when the long-term recurrence would occur. The average time to recurrence was 15.3 months. Goudakos et al. reported an average follow-up period of 48.4 months (12 months to 5 years), a recurrence rate of 9% and an average time to recurrence of 30 months (12 months to 48 months) [2]. Sham et al. reported that 89% of the first recurrences were diagnosed within the first two years post-operation [9]. In our study, the number of recurrences was 13 cases in the first 24 months postoperatively and 3 cases recurred after 2 years postoperatively. The mean recurrent interval was 17.3 months. This denotes that the recurrence rate may decrease after two years. Two of these three cases were reoperation cases, and the remaining one was a case wherein a lesion was suspected to recur six months postoperatively but was followed up without biopsy for a while. Hence, a biopsy should be done as early as possible when recurrence is suspected.

Conclusions

Proper resection of the mucosa at the tumour attachment could be sufficient without shaving the bone thickness of the tumour.

List of abbreviations

CT: computed tomography

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Authorship contribution

SK wrote the initial draft of the manuscript. KW contributed to analysis and interpretation of data. FG and KO have contributed to data interpretation and critically reviewed the manuscript. All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethics approval and consent to participate

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation (the Ethical Committee of Tokai University [approval number: 23R061-001 H]) and with the Helsinki Declaration of 1975, as revised in 2013.

Availability of data and materials

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflict of interest

The authors declare no competing interests.

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