Warthin's tumour seems to be the most common benign neoplasm of the parotid gland in Germany

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Abstract

Purpose Recent reports indicate an increase in the prevalence of Warthin's tumours (adenolymphoma) with percentages which exceed that of pleomorphic adenomas (PA) in the same registries. The purpose of this study is to analyse a large cohort of benign parotid tumours in relation to various demographic and other patients' characteristics that might affect their incidence.

Methods A retrospective review of prospective collected data was performed on all patients who have been operated for a parotid mass in the last 5 years. A total of 474 patients with benign lesion were included in the study. Age, gender, smoking status, histological diagnosis, site of lesion, and size of tumour were recorded.

Results Warthin's tumours were the most common benign lesions, found in 201 (42.4%) parotic glands followed by pleomorphic adenomas found in 138 (29.1%) of these surgical cases. Patients with WT had a mean age of 61.6 years instead of 52 years for PA patients ($t = 6.589$, $p < 0.001$). The vast majority (93%) of patients with WT had a current or previous history of smoking compared with 47% of PA patients ($p = 0.001$). There was a male predominance regarding WT with a male:female (M:F) ratio of 2.3:1, whereas the corresponding ratio of PA was 1:1.4.

Conclusions This study confirms the increased regional prevalence of WT reported in studies mainly carried out in central Europe. This could affect future management of WT, which remains largely controversial due to the extremely low malignant potential reported, concurrently with its higher rates of multiplicity and recurrence, as well as the moderately accurate results of FNA biopsies.

Introduction

Pleomorphic adenoma (PA) is commonly reported both in previous epidemiological studies and in educational literature as the most prevalent benign tumour of the parotid gland with an incidence of up to 75% [1]. However, in the last few years, an increased incidence of Warthin's tumours (WT) has been reported, with some publications indicating WT instead of PA as the most common histological diagnosis in their regions of study [2–4].

This change in epidemiological trends of benign parotic tumours reported lately in few European ENT departments requires further verification, since it opposes current established knowledge presented in reference otolaryngology textbooks. The increase of smoking habits in women and the utilization of advanced and more convenient imaging techniques can potentially affect epidemiological trends that are related to diagnosis of parotid masses.

In this context, a study of a large cohort of benign parotid tumours diagnosed during a short period of time in relation to various demographic and other patients' characteristics is justified. Therefore, the purpose of this study is to analyse a current database of benign parotid masses. In particular, PA and WT, which comprise the great majority of benign lesions, were compared with the aim of finding differences that could verify current epidemiological trends.

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Patients and methods

A retrospective review of prospectively collected data was performed on all patients who have been operated for a parotid mass from March 2014 to December 2018, in the department of Otolaryngology--Head and Neck Surgery (deleted for blinded purposes). Patients with benign histological diagnosis were included, whereas patients with malignant lesions were excluded from this study. All patients received preoperatively sonography of both parotid glands and cervical lymph nodes. A total of 474 patients were included in this study. Age, gender, smoking status, histological diagnosis, site of lesion, and size of tumour were recorded. All cases have been treated with total, superficial, or extracapsular parotidectomy with the aim of excising the tumour with a cuff of normal parotid tissue. This study was approved by the ethics committee.

Statistical comparisons between WT and PA were performed using standard non-parametric measures. To be more precise, Chi-squared, Mann–Whitney *U* test, and *t* test were utilized for categorical, ordinal, and normally distributed continuous variables, respectively.

Table 1 Histological diagnoses of the surgical specimens performed during the study period

Benign neoplasms	
Warthin's tumour	201
Pleomorphic adenoma	138
Basal cell adenoma	11
Lipoma/sialolipoma	10
Oncocytoma	7
Myoepithelioma	6
Hemangioma	4
Cystadenoma	2
Lymphadenoma	1
Benign lesions	
Cystic lesion*	30
Chronic hyperplastic lymph node	21
Chronic sialadenitis	13
Oncocytic hyperplasia	11
Lymphoepithelial lesions	11
Infected cystic lesion	4
Sarcoidosis	3
Sclerosing polycystic adenosis	1

Cystic lesions comprising retention cysts (10), salivatory duct cysts (3), lymphoepithelial cysts (12), and pseudocyst (5)

*A p value of <0.05 was considered significant

Results

Histological diagnoses of the surgical specimens performed during the study period are summarized in Table 1. Warthin's tumours were the most common benign lesions found in 201 (42.4%) parotid glands followed by pleomorphic adenomas in 138 (29.1%) of these cases. In two patients, both WT and PA were evident simultaneously in their histological examinations and were excluded from further comparisons [5]. Moreover, 12 patients had bilateral WT, whereas no patients with bilateral PA were identified.

Demographics and clinical features of WT and PA are presented in Table 2. Two hundred patients with WT with a mean age of 61.6 years were operated in the last 5 years, instead of 138 PA patients with a mean age of 52 years ($T=6.589$, $p<0.001$). As it was expected, there was a male predominance regarding WT with a male:female (*M*:*F*) ratio of 2.3:1, whereas the corresponding ratio of PA was 1:1.4. Detailed data on smoking status were available in a total of 176 patients (104 with WT and 72 with PA). The vast majority (93%) of patients with WT had a current or previous history of smoking compared with 47% of PA patients ($p=0.001$).

Mean size and median value of the larger diameter of the tumour estimated in postoperative histopathology examinations was 26 mm and 25 mm for WT and 28 mm and 25 mm for PA, respectively. These differences did not reach statistical significance. In addition, there was no preponderance of one site over the other (left vs. right) for both types of tumours. Moreover, no statistically significant results were found by comparing the various characteristics of both WT and PA presented during the first and the last year of this study (such data are not shown here).

Table 2 Comparison of demographics and basic clinical characteristics between Warthin's tumours (WT) and pleomorphic adenomas (PA)

	WT	PA	
No. of patients	201	138	
Right side	88	70	$X^2=0.0002$, $p=0.989$
Left side	101	68	
Bilateral	12	0	
No smoking	7	37	$X^2=52.233$, $p<0.001$
Quit smoking	39	23	
Smoking	58	11	
Men	139	58	$X^2=25.190$, $p<0.001$
Women	62	80	
Age	61.6 (SD = 9.9)	52 (SD = 17)	$t=6.589$, $p<0.001$
Size	25 (20–30)	25 (20–40)	$T=21{,}063$, $p=0.188$

Discussion

This study confirms the increased regional prevalence of WT reported in studies mainly from Germany and Poland [2, 3, 6, 7]. Furthermore it seems that nowadays, WT are the most common benign tumours of the parotid gland in their region. This is in accordance with two recent epidemiological studies from Germany. In more details, data analysed from over 400 patients with benign parotid lesions, surgically treated during the last decade in departments from east and north west Germany [2, 3], revealed an incidence of 44.9–48% for WT and 17.3–23% for PA.

The importance of this study consists in the inclusion of a very large number of patients in a short period of time. Their department represents one of the two biggest salivary gland centres of Bavaria, a region with over 10 million inhabitants. Therefore, the authors are confident that the results are representative for south Germany. The fact that the results are postoperative does not seem to alter the prevalence of the two most common benign tumours of the parotid gland significantly, since a watchful waiting was not recommended in neither of these cases. Other typical clinical and epidemiological characteristics of WT, namely manifestation in old age, history of tobacco smoking, and predominance of the male gender, have also been demonstrated in this study.

The relative increase in the incidence of WT with a change in WT/PA ratio has also been shown in longitudinal studies [2, 6, 8–11] or demonstrated in recent reports even in regions other than central Europe [12–14]. Even so, this effect is not observed in all populations [15, 16]. The increase in the occurrence of WT shown in earlier reports commonly in parallel to a decline in the man-to-woman ratio has been attributed mainly to two factors: (a) an increasing proportion of women smokers among the general population and (b) a widespread use of better imaging techniques (ultrasound, CT, MR, and PET-CT).

The strong association of WT with smoking has been well documented in previous reports [9, 17, 18]. The very high proportion of smokers or ex-smokers in the WT population of this study which statistically differs significantly from the corresponding percentage of PA patients confirms this association. Thus, the hypothesis that increased cigarette consumption in women may explain at least partially the increased incidence of WT seems rational. Other potentially aggravating factors have not been studied. In addition, a site predisposition (e.g., right over left) was not found, if this is of any value in relation to increased mobile technology use during the last several years.

Another important factor that is related to diagnostic methods is the widespread use of US in the ENT clinics in Germany by the otolaryngologists and the improvement of spatial resolution and other characteristics of US in the last two decades [19]. Head and neck US, as a convenient and useful diagnostic modality, is commonly included in the basic ENT training in Germany and is available in the majority of outpatient clinics [20]. This could have played a role in the relatively younger age of diagnosis in relation to previous reports which conform to the mean age mentioned in recent studies by nearby departments [10].

There is a lot of discussions on the pathogenesis of WT and whether it constitutes a true neoplasm. The polyclonality of the epithelial and lymphatic elements is compatible to the non-neoplastic origin of WT. The consistent identification of lymphatic sinus in Warthin's tumours and the occurrence of tuberculosis, metastases, and malignant lymphomas in the lymphoid stroma of these tumours supports the hypothesis that these lesions arise within lymph nodes [21, 22] Recently other researchers found that patients with Warthin's tumours had a significantly higher body mass index in comparison to patients with other benign parotid gland tumours and suggested a correlation of Warthin's tumours to obesity [23]. Therefore, based on its increased incidence and its extremely low malignant potential, a watchful waiting approach has been proposed lately [24]. In contrast to this, a more radical surgical approach has also been proposed previously, based on the relatively higher rates of multiplicity and metachronous tumours reported for WT as well the false-positive results of FNAb [25]. Punch biopsies or appropriately validated molecular diagnostic panels may increase significantly the diagnostic accuracy, which obviously plays a key role in management. The increased incidence of WT reported here, as well as in other recent studies, cannot change the routine of their clinical practice but is an important epidemiological information and can contribute to the evolution of parotid surgery in benign diseases [10]. They hope that this study will encourage other groups to verify these results in their patient collectives.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in this study were in accordance with the ethical standards of the institution or practice at which the studies were conducted (BKF 2018/15).

Informed consent Informed consent was obtained from all individual participants included in this study. (NO identifying information about participants is available in the article).

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