



Meta-analysis of surgical approaches to the treatment of parotid pleomorphic adenomas and recurrence rates



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ARTICLE INFO

Article history:

Paper received 2 October 2014

Accepted 18 March 2015

Available online 26 March 2015

Keywords:

Pleomorphic adenoma

Surgical management

Recurrence rates

ABSTRACT

Introduction: Different types of surgical management of pleomorphic adenoma of the parotid gland are associated with different recurrence rates.

Material and methods: A systematic review of literature until 2014 with meta-analysis was conducted. Inclusion criteria were original studies of patients with surgical management for pleomorphic adenoma of the parotid gland and recurrence rates, with a median follow-up period of 5 years. The Newcastle–Ottawa Quality Assessment Scale (NOQAS) was used to assess the quality.

Results: Sixteen studies were included. Four studies show a low recurrence rate (0.01, 95% confidence interval [CI] = 0.00–0.02) after total parotidectomy. Twelve studies show a low recurrence rate (0.02, 95% CI = 0.01–0.03) after superficial parotidectomy. Six studies show a low recurrence rate (0.02, 95% CI = 0.01–0.04) after limited parotidectomy. Six studies demonstrate a low recurrence rate (0.01, 95% CI = 0.00–0.04) after extracapsular dissection. Five studies report a low-to-medium recurrence rate (0.08, 95% CI = 0.03–0.14) after extracapsular enucleation.

Conclusion: Information about recurrence rates, times of recurrence in relation to type of surgical treatment, and significance of capsule rupture is very poor. With regard to recurrence rates and surgical approaches, the types of operations that show the lowest recurrence rate are total parotidectomy and extracapsular dissection. Controversies over surgical treatment of PA of parotid gland remain, and the safest surgical method for the removal of this tumors has not been identified.

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1. Introduction

Pleomorphic adenomas (PA) of the parotid are well known for their propensity to recur after excision. Before the 1940s, the routine operation of pleomorphic adenomas (PA) of the parotid gland was extracapsular enucleation (ECE), and this was associated with a high recurrence rate (~35%). Formal superficial parotidectomy (SP) became established as the appropriate treatment, and recurrence rates declined dramatically to below 2% (McGurk and Cascarini, 2013).

The gold standard for excision was to remove the tumor with a cuff of normal salivary tissue.

The importance of the surrounding cuff was emphasized as a result of early studies finding “pseudopods” of tumor apparently extending through the capsule and into normal tissue (Ghosh et al., 2003; Witt, 2002).

From an oncologic standpoint, complete superficial lobectomy often makes no sense, and with the current emphasis on maximum preservation of the facial nerve, marginal excision has become more common (Rea, 2000). The actual margin or cuff of normal tissue between the mass and the facial nerve that is to be spared is often minimal to nonexistent.

Except for possible malignancy that might require sacrifice of the facial nerve, the final margin of resection is generally the shortest distance from the tumor mass to the facial nerve.

With the introduction into healthcare of the principle of “minimum effective treatment” in place of “maximum tolerable treatment”, the debate on the most useful technique becomes acutely real. Due to the difficulties of conducting a multicentre prospective

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randomized study to evaluate the best surgical technique for the PA of the parotid gland, literature reviews have been conducted (Witt, 2002; Zbaren et al., 2013).

The main problem in this kind of study is the heterogeneity of the data reported or the lack of information in the original reports. To avoid or minimize this problem, the present systematic review was conducted using a quality analysis of the original studies and statistical analysis to evaluate and compare the recurrence rate of different surgical approaches in the management of PA of the parotid gland.

2. Material and methods

A systematic review with meta-analysis was conducted. Original articles were searched through PubMed, Embase, Web of Science, and Scopus until 1 March 2014, using various combinations, in line with the specific database language, of the terms “pleomorphic adenoma” and “parotid” and “recurrence.” Additional studies were taken from reference lists of previous review articles, and citations of relevant original articles were screened. For the EMBASE and Medline database searches, these same keywords (and variants) were used as both text words and Medical Search Headings (MeSH terms) and were combined by using Boolean operators. The “related articles” tool was used to improve the PubMed searches, and references of included studies were checked by a research librarian.

Studies were selected if they satisfied all of the following inclusion criteria: original studies based on human beings; sample included only patients with surgical management for PA of parotid gland and recurrence rate, with every case of recurrence associated with the type of surgery performed; and a median follow-up period of 5 years. The citations (title and abstract) identified from all sources were screened independently by two reviewers (R.C., G.C.). Subsequently, full-text articles selected by titles and abstracts were reviewed to identify the final set of eligible studies. The evaluators discussed their findings, and when disagreement occurred, it was resolved through further discussion and re-reading.

2.1. Data extraction

The following characteristics of each study were listed: publication year, provenience, sample size, type and number of cases for

each surgical technique performed, and number of recurrence for each type of surgery performed (Table 1).

To provide a quantitative appraisal, recurrence rates were evaluated according to surgical approach (total parotidectomy [TP], superficial parotidectomy [SP], limited parotidectomy [LP], extracapsular dissection [ECD], and extracapsular enucleation [ECE]) and the associations between recurrences were reported, as well as capsular rupture occurring during operations and the dimension of the tumor where indicated.

2.2. Quality analysis

All eligible studies were assessed for methodological quality by two independent reviewers.

The Newcastle–Ottawa Quality Assessment Scale (NOQAS) for cohort studies (http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp) was used by each reviewer to assess the overall quality of each eligible study. This scale allocates a maximum of 7 points for outcome of study, type of study, quality of selection, length of follow-up, dropout description, adjunctive information (dimension and localization), and capsule rupture information. Studies were included if quality analysis was 2 or more.

The two reviewers evaluated the implementation of this assessment tool and agreed on a method before their independent assessments of the studies. Disagreements were resolved by discussion (Table 2).

2.3. Statistical analysis

Study characteristics and results are presented in tables and plots. The proportion of patients with recurrence was the primary outcome. Exact binomial 95% confidence intervals (CI) were calculated for each study and surgical approach. Summary measures were calculated after arcsine transformation of the study proportions, and weighted means were reported after a back-transformation. For each surgical approach, a meta-analysis was performed including only studies with 10 or more treated patients. Heterogeneity between studies was assessed by using the Q statistic and I^2 (Egger et al., 2001). A p value of the Q statistic that was less than 0.10 was considered significant (Egger et al., 2001). I^2 values of 25%, 50%, and 75% correspond to cut-off points for low, moderate, and high degrees of heterogeneity. If overall

Table 1
Characteristics of included studies.

First author, year	Number of cases	Provenience	Total parotidectomy (TP)	Superficial parotidectomy (SP)	Limited parotidectomy (LP)	Extracapsular dissection (ED)	Enucleation
1. Woods, 1985	55	USA		55			
2. Maimaris and Ball, 1986	78	UK		29			49
3. Maynard, 1988	114	UK		114			
4. Wennmo et al., 1988	90	Sweden		57	33		
5. al-Naqeeb et al., 1992	147	Kuwait	10	137			
6. Debets and Munting, 1992	92	The Netherlands	16	71	5		
7. Dallera et al., 1993	71	Italy				71	
8. Natvig and Sjøberg, 1994	100	Norway	100				
9. Laccourreye et al., 1994	238	France		143	40		5
10. Laskawi et al., 1996	213	Germany	60	139			14
11. McGurk et al., 1996	475	UK		95		380	
12. Henriksson et al., 1998	213	Sweden	2	181			14
13. Leverstein et al., 1997	246	The Netherlands	8	61	177		
14. Satko et al., 2000	535	Slovakia		360			175
15. Marti et al., 2000	264	Greece	15	110		139	
16. Ayoub et al., 2002	58	UK		58			
17. Witt, 2002	60	USA	20		20	20	
18. Ghosh et al., 2003	83	UK	2	49	2	22	8
19. Berjis et al., 2007	11	Iran				11	
20. Iro et al., 2013	219	Germany	57	68	18	76	

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