Smell disorders evolution after chronic rhinosinusitis with polyps surgery

Evolution des troubles de l'odorat après chirurgie de la rhino-sinusite chronique avec polypes

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ABSTRACT

Objective: The effects of chronic rhino sinusitis with polyps (CRSWP) surgery on smell symptoms have not been sufficiently studied. The aim of this study was to evaluate the impact of CRSWP surgery on smell symptoms over short and long-term follow-up and to identify the factors that might influence their evolution.
Patients and methods: This was a retrospective study about 184 patients operated endoscopically for CRSWP. In post operative period, long-term local steroids were prescribed systematically. The sense of smell was evaluated pre- and post-operatively according to a subjective score (1: good smell, 2: hyposmia, 3: anosmia). Some factors, related to the patient, the CRSWP and the treatment, were tested in order to identify predictors of smell outcome after surgery..
Results: Before surgery, the anosmia and the hyposmia were noted in 90.8% and in 8.7% of cases, respectively. At six months after surgery, the improvement of olfactory score was significant: 84% of patient had the score 1 compared with 0.5% preoperatively ($p < 0.0001$). This improvement was maintained during the 2 first years and decreased significantly at 3 years, although an average delay of polyps recurrence was 23.4 months. Among the factors studied in our series, only the observance of postoperative corticosteroids was retained as a predictor of smell recovery after surgery ($p = 0,011$).
Conclusion: CRSWP surgery can significantly improve the smell sense, especially during the two first years. This effect can be sustainable if good post operative compliance for local corticosteroid are achieved.
Keys words: Nasal polyposis; smell; anosmia; endoscopic sinus surgery; local corticosteroid.

RÉSUMÉ

Objectif: Les effets de la chirurgie de la rhinosinusite chronique avec polypes (CRSWP) sur l'olfaction n'ont pas été suffisamment étudiés. Le but de cette étude était d'évaluer l'impact de la chirurgie de CRSWP sur les symptômes olfactifs au cours d'un suivi à court et à long terme et d'identifier les facteurs pouvant influencer leur évolution.
Patients et méthodes: Il s'agit d'une étude rétrospective portant sur 184 patients opérés par voie endoscopique pour CRSWP. En période post opératoire, des corticoïdes locaux au long cours étaient systématiquement prescrits. L'odorat était évalué en pré et postopératoire selon un score subjectif (1: odorat normal, 2: hyposmie, 3: anosmie). Certains facteurs, liés au patient, à CRSWP et au traitement, ont été testés afin d'identifier les facteurs prédictifs de l'évolution de l'odorat après la chirurgie.
Résultats: Avant la chirurgie, l'anosmie et l'hyposmie étaient notées respectivement dans 90,8 % et 8,7 % des cas. A six mois postopératoires, l'amélioration du score olfactif était significative: 84 % des patients avaient le score 1 contre 0,5 % en préopératoire ($p < 0,0001$). Cette amélioration était maintenue durant les 2 premières années et a diminué significativement à 3 ans, bien que le délai moyen de récidive des polypes ait été de 23,4 mois. Parmi les facteurs étudiés dans notre étude, seule l'observance de la corticothérapie postopératoire a été retenue comme facteur prédictif de la récupération de l'odorat après chirurgie ($p = 0,011$).
Conclusion: La chirurgie de la CRSWP peut améliorer significativement l'odorat, surtout pendant les deux premières années. Cet effet peut être durable si une bonne observance du corticoïde local postopératoire est obtenue.
Mots clés: Polypose nasale; Odorat; Anosmie; Chirurgie endoscopique des sinus; Corticoïde local.

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INTRODUCTION

Nasal polyposis (CRSWP) is the most common cause of loss of sense of smell in ENT [1]. This disorder can significantly compromise quality of life of patients and may indicate surgical treatment. The effects of CRSWP surgery on smell symptoms are not been sufficiently studied and they remain controversial.

The aim of this study was to evaluate the impact of CRSWP surgery in smell symptoms over short and long-term follow-up and to identify the factors that may influence it.

METHODS

It was a retrospective study conducted between January 2006 and June 2016 about 184 patients who were operated for CRSWP in the ENT department. The stage of CRSWP was defined according to Lildholdt classification (stage 0: no polyposis; stage 1: small polyps not reaching the upper edge of the inferior turbinate; stage 2: medium sized polyps reaching between the upper and lower edge of the inferior turbinate; stage 3: large polyps reaching below the lower edge of the inferior turbinate). In case of asymmetrical involvement, the more reached side was considered.

Inclusion criteria were i) failure of medical treatment of CRSWP (ii. daily spray nasal corticosteroids for at least 6 months and at least one cure of orally steroids), iii) endoscopic surgery. The type of surgery (functional or radical) depended on the surgeon's choice. Post operatively, long-term local steroids were prescribed systematically.

The assessment of smell was performed preoperatively and at 6 months, one, two, three and four years post operatively. It was based on the following subjective score (Adora score): 1: good smell, 2: hyposmia, 3: anosmia.

Some factors were tested in order to identify a possible correlation between the surgery and improvement of smell sense. These factors were type and stage of nasal polyposis, type of surgery and post operative corticosteroids observance. Statistical analysis was performed with SPSS 20 software and a p value < 0.05 was considered to be significant.

RESULTS

Our study included 81 females (44 %) and 103 males (56%) with a mean age of 43 years (ranges: 16 - 73 years). The CRSWP was at the first stage in 72%, at the second one in 22% and at the third one in 7%. The type of CRSWP was I (isolated NP) in 120 patients (65.2%), II (NP and asthma) in 25 patients (13.6%), III (Widal syndrome) in 31 patients (16.8%) and IV in 8 patients (4.4%) (Woakes syndrome in 7 cases and Kartagener syndrome in one case).Before surgery, the smell score was one (normal smell) in 0.5%, two (hyposmia) in 8.7% and three (anosmia) in 90.8%, of cases. The anosmia rate was 86.7% in type I NP, 96% in type II NP and 100% in type III - IV NP.

The surgical procedure was a functional ethmoïdectomy in 42.9% of cases and radical ethmoïdectomy in 57.1% of cases. Simple polypectomy was not performed in any case. One hundred and one patients (82%) had a good compliance with postoperative local corticosteroid therapy. The average of the follow up was 22.8 months (ranges: 6 - 120 months).

Six months after surgery, improvement of olfactory score was significant. In fact, the rate of patients with score one has increased from 0.5% pre-operatively to 84% after surgery. (p<0.0001)(Figure1).

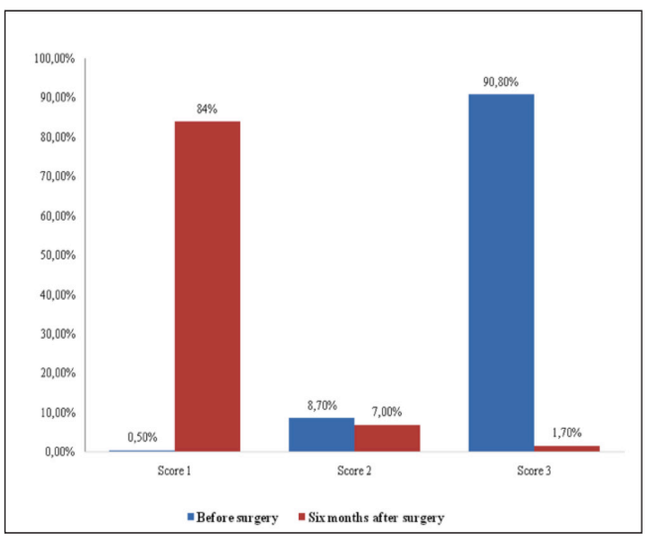

Figure 1: Smell score values before and 6 months after surgery.

This improvement was maintained during the first 2 years (77% at 1 year and 82% at 2 years postoperatively). Since the third year, there was a marked deterioration of the smell sense, as shown in the figure 2.

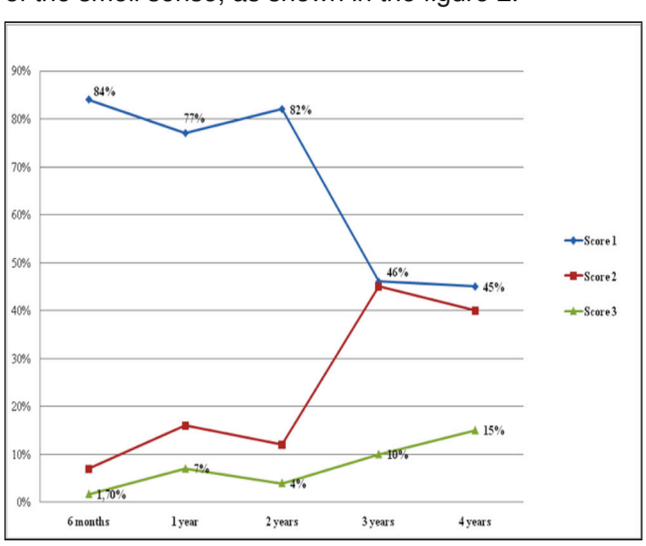

Figure 2: Evolution of smell score postoperatively over the time

This deterioration appeared one year after the recurrence of CRSWP. In fact, the overall recurrence rate of CRSWP was 26.6% (49 cases) with an average delay of 23.4 months (range: 6 – 84 months) and 84% of recurrences occurred during the first two years.

Thus, the recurrence of the CRSWP could not explain, alone, the degradation of the quality of the olfaction. In univariate analysis, among the factors which were tested, only the observance of local steroids was significantly associated with the improvement of the smell at 6 month post operatively (p = 0.011) (table I). The difference remained significant at 1 year post operatively, (p = 0.02). Similarly, this is the only factor that was retained in multivariate analysis.

Table I: Statistical study of factors of improvement of smell after NP surgery

		Smell score at 6 months postoperatively		p
		Score 1 (normal smell) Number (%)	Score 2 – 3 (hypo / anosmia) Number (%)	
Stage of NP	Stage 1	10 (77%)	3 (23%)	0.353
	Stage 2	35 (85.3%)	6 (14.7%)	
	Stage 3	110 (84.6%)	20 (15.4%)	
Type of NP	Type I	102 (85%)	18 (15%)	0.549
	Type II	22 (88%)	3 (12%)	
	Type III	26 (93.9%)	5 (16.1%)	
	Type IV	5 (62.5%)	3 (37.5%)	
Type of surgery (ethmoidectomy)	Functional	68 (86%)	11 (14%)	0.553
	Radical	87 (83%)	18 (17%)	
Observance of local steroids	Good	132 (87.4%)	19 (12.6%)	**0.011**
	Bad	23 (69.7%)	10 (30.3%)	

DISCUSSION

Chronic rhinosinusitis commonly involve direct effects on the olfactory mucosa (sensory disorder) and on gross changes in airflow to the olfactory cleft (transport disorder). Chronic rhinosinusitis is classified as polypoid and non polypoid rhinosinusitis. Few researchers have investigated on the postoperative outcome of smell disorders in patients with polypoid sinusitis (or CRSWP) [2-6]. However, there are several studies that evaluated smell disorders in both polypoid and non polypoid rhinosinusitis [7]. Two recent studies, one of which was prospective, found that CRSWP was a significant predictor of better postoperative olfactory outcomes [8, 9]. Although patients with CRSWP are at risk for recurrence, the removal of mechanical obstruction from the olfactory cleft and consequent increase in intranasal volume could improve olfactory function [9].

The evaluation of olfactory function was achieved subjectively in most of the series [1, 2, 3]. Patient's self-reported assessment of olfactory dysfunction has poor sensitivity (40%) and specificity (30%) for the evaluation of olfactory impairment [10, 11]. A few prospective studies was performed with objective olfactory tests but the heterogeneity of these tests and the variation of postoperative follow-up duration between the different studies made the interpretation of data difficult [10, 11, 12]. In our study, the evaluation of olfactory was only subjective (Adora score) which represents its main limit. We found statistically significant improvement in subjective olfactory function after surgery. These findings are in accordance with those of the literature. In fact, the rate of complete recovery of smell after surgery varies between 60 and 90% [3, 4, 5, 7, 10].

Some studies showed that resolution of olfactory impairment after surgery was brief and temporary [5, 13]. In contrast, others authors have found a significant improvement in anosmic patients at 6 months sustained at 12 month [8]. In the other hand, the fellow up in the several series was limited (6 months or less) [3, 4, 6, 8, 13] and some were retrospective. Then conclusions and comparison between different studies were difficult. In our series, which was retrospective, the mean fellow up was 22 months and the improvement of smell was maintained during the 2 first years postoperatively.

In our series, olfactory outcome was not related to CRSWP type. These findings was also found in other studies such as those of Folia et al. and Dufour et al. who concluded that neither asthma nor Widal syndrome affected the postoperative smell desorders improvement [14, 15]. However, Widal syndrome was associated with a poor outcome in the retrospective study of Facon et al. about 400 cases [16]. In the study of Litvack et al, aspirin intolerance was not a significant predictor of postoperative olfactory improvement [8]. Unlike our series, many studies found that a higher endoscopic grading of CRSWP was predictive of less postoperative olfactory improvement [8, 16, 17].

Few studies had compared functional surgery versus radical one concerning postoperative olfactory outcomes. Radical surgery had better results in two studies [15, 16] but not in another one [8]. Havas and Lowinger concluded that resection of the middle turbinate with preservation of the mucosa, as recommended in the functional surgery, could be not sufficient to restore a normal smell [18]. So, Jankowsky et al recommended maximal removal of the inflamed mucosa of the ethmoidal roof and the adjacent surface of the concha lamina with middle turbinate resection [6]. Better recovery of smell disorder after radical ethmoidectomy could be explained by the lower rate of relapses, and especially a large diffusion space for local corticosteroid [6]. Nevertheless, some autopsy studies revealed the presence of olfactory tissue in the middle turbinate. So, radical endoscopic surgery could theoretically affect the sense of smell. However, according to prospective studies, the middle turbinate resection did not influence the postoperative olfactory outcomes in the majority of the cases [6, 18]. In our series, there was no difference between radical and functional surgery.

The good adherence of topical steroids was the only predictive factor of smell improvement in our series at 6

and 12 months postoperatively. Jankowsky et al. found that a low dose topical steroid was associated with more stable results [6]. Conversely, the use of topical or systemic corticosteroids had not any influence on olfactory scores at one year postoperatively in the series of Litvack et al. [8].

CONCLUSION

CRSWP surgery can significantly improve the smell sense, especially during the two first years. This effect can be sustainable if good post operative compliance for local corticosteroid will be achieved.

Better prediction of surgical outcome of smell can be investigate through larger prospective studies with long-term follow up and more objective olfactory tests.

Compliance with ethical standards

Conflict of interest: The authors stated that there is no conflict of interest.

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