Rhinology, 49, 497-498, 2011

Olfaction – the Cinderella of the senses?

In the United Kingdom this time of year is traditionally the occasion for a very particular entertainment, the Christmas pantomime. One of the most popular subjects for this comedy pastiche of fairy tale and morality play is the story of Cinderella, that archetypal tale of 'rags to riches'. Whilst the analogy may seem a little far-fetched, olfaction is not infrequently referred to as the 'Cinderella of the senses' presumably as it is perceived as receiving less attention than the other senses so it is perhaps appropriate that this December issue should contain a number of publications on this topic.

Smell influences our lives from conception to death, our very survival may depend on it and yet it is interesting to reflect that whilst Nobel prizes were given in the early 1960's for the discovery of the rod and cone mechanism in the eye and to von Bekesy for his work on hearing, it was not until 2004 that Richard Axel and Linda Buck received the Nobel Prize in Physiology or Medicine for discovering olfactory receptor proteins which make up the largest gene family thus discovered. The exact mechanism by which odours are perceived by the brain remains largely enigmatic as does the role of the accessory olfactory vomeronasal organ, an area explored by Braun et al in this issue [1], despite it being first described by Jacobson in 1811 [2].

The negative impact of loss of smell on quality of life has been shown by a number of authors [3-6]. It has also been shown to be a major concern in survivors of sinonasal malignancy who have had the olfactory system removed by craniofacial resection [7] or damaged by chemoradiation [8,9] and as a consequence is a recommended area of research in the recent European Position Paper on the endoscopic management of tumours in this region [10].

The early adverse effect of neurodegenerative diseases on olfaction has stimulated a lot of interest as its detection may enable population screening and therapeutic intervention. As long ago as 1998 a meta-analysis of 43 papers comparing Alzheimer's and Parkinson's disease with controls showed significant defects in odour identification, recognition and detection threshold in these conditions [11]. This is becoming of greater importance as the population ages world-wide [12].

Temporary loss of smell is of course rather common. In a study of 2197 women aged between 50-64 years, 15% experienced one or more episodes of temporary anosmia usually associated with nasal obstruction during a prospective diary study over one year [13]. However, common causes of more chronic loss include viral upper respiratory infection, head trauma and chronic sinonasal conditions such as nasal polyposis [14-16] though as is so often the case, 'idiopathic' remains one of the largest groups in such studies. The lower respiratory tract can also provide a further confounding factor in the adverse effect of nasal polyposis on smell [17].

The effects of many of these causes of olfactory loss on the olfactory bulbs have been elegantly demonstrated on MRI by Rombaux and colleagues [18]. However, from a clinical point of view, whilst access to a range of olfactory tests is improving, these are not universally available and often need linguistic and cultural validation [19, 20].

Although a considerable amount of research has undertaken into olfaction, many clinicians still seem rather nihilistic about loss of smell, perhaps because they feel that little can be done to positively influence it. However, a number of recent studies [21-24] have shown improvement in olfaction following sinonasal surgery for chronic rhinosinusitis with or without nasal polyposis , albeit in the short-term. Rowe-Jones et al., in their seminal long-term study after endoscopic sinus surgery were able to show sustained benefit in olfactory detection threshold at one and two years post-operatively although there was no statistical difference at the end of 5 years of follow-up [25].

A range of medical therapies are also available which alone or in combination with surgery, may improve and /or maintain olfactory improvement [4-6,21,24]. Foremost of these are steroids, in particular when given systemically in nasal polyposis, as demonstrated by Kirtsreesakul et al., in one of a small number of placebo-controlled studies in this area though there is still debate as to the dose, duration and frequency with which this course of treatment may be used [26-28]. There is also interest in more unusual preparations and approaches which may hold promise for the future [29,30].

Thus one may conclude that whilst it may have been true in the past that olfaction was a rather neglected area of basic and clinical research, as for Cinderella, there is a happy ending or at least an enormous burgeoning of interest in all aspects of this fascinating sense.

So as the end of the year approaches, on behalf of myself, Professor Fokkens and all the editorial and administrative staff at 'Rhinology' I would like to wish you the very best compliments of the season with excellent smell and taste to enjoy it.

REFERENCES

1. Th. Braun, B. Mack, M.F. Kramer. Solitary chemosensory cells in the respiratory and vomeronasal epithelium of the human nose: a pilot study. Rhinology 2011, 49: 507-511.
2. Jacobson L. Description anatomique d'un organe observe dans les mamiferes. Annales Musee d'Histoire Nationale de Paris. Paris 1811; 18: 412.
3. Miwa T, Furukawa M, Tsukatani T, Cosranzo R, DiNardo L, Reiter E. Impact of olfactory impairment on quality of life and

disability. Arch Otolaryngol Head Neck Surg 2001; 127: 497-503.
4. Alobid I, Benitez P, Bernal-Sprekelsen M, et al. Nasal polyposis and its impact on quality of life: comparison between the effects of medical and surgical treatments. Allergy 2005; 60: 452-458.
5. Alobid I, Benitez P, Pujols L, et al. Severe nasal polyposis and its impact on quality of life. The effect of a short course of oral steroids followed by long-term intranasal steroid treatment. Rhinology 2006; 44: 8-13.
6. Ragab S, Lund V, Scadding G, Saleh H, Khalifa M. Impact of chronic rhinosinusitis on quality of life: a prospective randomised controlled study. Rhinology 2010; 48: 305-311.
7. Jones E, Lund V, Howard D, et al. Quality of life of patients treated surgically for head and neck cancer. J Laryngol Otol 1992, 106: 238-242.
8. Holscher T, Seibt A, Appold S, et al. Effects of radiotherapy on olfactory function. Radiother Oncol 2005; 77: 157-163.
9. Muller A, Landis B, Platzbecker U, Holthoff V, Frasnelli J, Hummel T. Severe chemotherapy-induced parosmia. Am J Rhinol 2006; 20; 485-486.
10. Lund V, Stammberger H, Nicolai P, Castelnuovo P, et al. European Position Paper on Endoscopic Management of the Nose, Paranasal Sinuses and Skull Base. Rhinology 2010; Supplement 22, pp 1-144.
11. Mesoholam J, Moberg P, Mahr R, Doty R. Olfaction in neurodegenerative disease. Arch Neurol 1998; 55: 84-90.
12. J. Hidalgo, G. Chopard, J. Galmiche, L. Jacquot, G. Brand. Just noticeable difference in olfaction: a discriminative tool between healthy elderly and patients with cognitive disorders associated with dementia. Rhinology 2011, 49: 512-517.
13. Lund V, Preziosi P, Hercberg S, et al. Yearly incidence of rhinitis, nasal bleeding and other nasal symptoms in mature women. Rhinology 2006; 44: 26-31.
14. Leopold D, Hornung D, Youngentob S. Olfactory loss after upper respiratory infection. In Getchell T et al, editors: Smell and taste in health and disease. New York 1991, Raven Press
15. Bramerson A, Johansson L, Ek L, Nordin S, Bende M. Prevalence of olfactory dysfunction: the Skovde population-based study. Laryngoscope 2004: 114: 733-737.
16. Ciofalo A, Filiaci F, Romeo R, Zambetti G, Vestri A. Epidemiological aspects of olfactory dysfunction. Rhinology 2006; 44: 78-82.
17. I. Alobid, S. Cardelus, P. Benítez, J.M. Guilemany, J. Roca-Ferrer, C. Picado, M. Bernal-Sprekelsen, J. Mullol. Persistent asthma has an accumulative impact on the loss of smell in patients with nasal polyposis. Rhinology 2011, 49: 518-525.
18. Rombaux P, Duprez T, Hummel T. Olfactory bulb volume in the clinical assessment of olfactory dysfunction. Rhinology 2009; 47: 3-9.
19. Fokkens WJ, Lund VJ, Mullol J, et al. Position paper on rhinosinusitis and nasal polyps. EAACI Task Force 2007. Rhinology Supplement 20: pp136.
20. Scadding G, Hellings P, Alobid I, et al. Diagnostic tools in Rhinology. EAACI Position Paper. Clin Translat Allergy 2011, 12; 1-39.
21. BlomquistE, Lundblad L, Anggard A, Haraldsson P-O, Stjarne P. A randomised controlled study evaluating medical treatment versus surgical treatment in addition to medical treatment of nasal polyposis. J Allergy Clin Immunol 2001; 107: 224-228.
22. Enhage A, Olsson P, Kolbeck K-G, et al. Functional endoscopic sinus surgery improved asthma symptoms as well as PEFR and olfaction in patients with nasal polyposis. Allergy 2009, 64: 762-769.
23. Pade J, Hummel T. Olfactory function following nasal surgery. Laryngoscope 2008, 118: 1260-1264.
24. Olsson P, Ehnhage A, Nordin S, Stjarne P. Quality of life is improved by endoscopic surgery and fluticasone in nasal polyposis with asthma. Rhinology 2010, 48: 325-333.
25. Rowe-Jones J, Medcalf M, Durham S, Richards D, Mackay I. Functional Endoscopic Sinus Surgery: 5 year follow-up and results of a prospective, randomised, stratified, double-blind, placebo-controlled study of post-operative fluticasone propionate aqueous nasal spray. Rhinology 2005; 43: 2-10.
26. Benitez P, Alobid I, de Haro J, et al. A short course of oral prednisone followed by intranasal budesonide is an effective treatment of severe nasal polyps. Laryngoscope 2006; 116: 770-775.
27. Hissaria P, Smith W, Wormald P, Taylor J, Vadas M, Gillis D, Kette F. Short course of systemic corticosteroids in sinonasal polyposis:a double-blind, randomized, placebo-controlled trial with evaluation of outcome measures. J Allergy Clin Immunol 2006; 118: 128-133.
28. V. Kirtsreesakul, K. Wongsritrang, S. Ruttanaphol. Clinical efficacy of a short course of systemic steroids in nasal polypsis. Rhinology 2011, 49: 526-533.
29. Panagiotopoulos G, Naxakis S, Papavasiliou A, Filipakis K, Papatheodorou G, Goumas P. Decreasing nasal mucus Ca^{++} improves hyposmia. Rhinology 2005; 43: 130-134.
30. Koo B, Jung B, Kim S, et al. The effect of a herbal combination of primrose, gentian root, vervain, elder flowers and sorrel on olfactory function in patients with a sinonasal olfactory dysfunction. Rhinology 2011; 49: 479-485.

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