

Clinical aspects of olfaction

Akademisk avhandling

som för avläggande av medicine doktorsexamen
vid Sahlgrenska Akademien vid Göteborgs Universitet
kommer att offentligen försvaras
i hörsal ”Arvid Carlsson”, Academicum, Medicinaregatan 3,
onsdagen den 1 oktober 2008 kl. 13.00

av

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This thesis is based on studies reported in the following papers, which will be referred to in the text by their Roman numerals:

- I Brämerson A, Johansson L, Ek L, Nordin S, Bende M. Prevalence of olfactory dysfunction: the Skövde population-based study. *Laryngoscope* 2004; 114:733-7.
- II Brämerson A, Nordin S, Bende M. Clinical experience with patients with olfactory complaints and their quality of life. *Acta Otolaryngol* 2007; 127:167-74.
- III Brämerson A, Millqvist E, Ydse B, Larsson C, Olofsson JK, Bende M. Event-related potentials in patients with olfactory loss. *Acta Otolaryngol*, E-publ 2008.
- IV Brämerson A, Mercke C, Nordin S, Bende M. Olfactory loss after head and neck radiation therapy. In manuscript.

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Abstract

The most important aims of this thesis were: (1) to investigate the prevalence of olfactory dysfunction in an adult Swedish population and to relate dysfunction to factors of possible impact on olfaction, (2) to present our experience with patients seeking medical attention for olfactory disorders, (3) to describe the relationship between detection and identification tests for olfactory disorders, (4) to assess olfactory event-related potentials (OERPs) in patients with olfactory impairment and in healthy controls, thereby exploring possibilities and limitations regarding to the clinical utility of the method, and (5) to evaluate the effect on the sense of smell of radiation in patients treated for head and neck cancer.

Materials and methods: In the population-based study, 1900 adult subjects were drawn from the municipal register (I). Of these, 1387 were tested for olfactory impairment and questioned with regard to their sense of smell and relevant medical conditions. Three hundred and three patients seeking medical care for olfactory disturbances were clinically examined and tested with detection and identification tests: 102 of these patients also answered a questionnaire with regard to quality of life (II). OERPs were obtained after stimulation with an olfactometer in 23 patients and 24 healthy controls (III). The effect of radiation on the olfactory organ was investigated in 71 patients with head and neck tumors, before and after radiotherapy (IV).

Results: The overall prevalence of olfactory dysfunction in adults was 19.1%, with 13.3% suffering hyposmia and 5.8% anosmia (I). Olfactory dysfunction (hyposmia and anosmia), was related to high age, male gender, and nasal polyps. Prevalence of anosmia in particular was found to be related to high age, nasal polyps, and diabetes mellitus. In neither case was there a relation to smoking (I). Upper respiratory tract infection was the most likely cause of olfactory disorder in close to 30% of the cases, followed by nasal polyposis, head trauma, and aging. However, the suggested etiology was not possible to determine in one third of the cases. Clinically, a strong relationship was found between the detection and identification tests (II). Patients with olfactory disorders have reduced quality of life relating to paid employment, household work, and social and family life (II). The OERPs in patients showed reduced amplitude and longer latencies compared to controls. Increasing concentration of the stimulant odor increased the OERPs (III). Patients who were exposed to a high dose of radiation against the olfactory organ showed reduced olfactory capability compared to those exposed to a low dose (IV).

Conclusions: Olfactory dysfunction is common in society. Patients seeking medical attention for olfactory disorders should be investigated for both quantitative and qualitative disorders with reliable tests because impaired olfactory function is associated with a reduced quality of life. Patients who will be treated with radiation for tumors near the olfactory region should be informed of the risk of olfactory deterioration.

Key words: olfactory disorders, epidemiology, quality of life, diagnosis, event-related potentials, radiation therapy.