Karolinska Institutet

Institutionen för klinisk vetenskap, intervention och teknik,
Enheten för öron-, näs- och halssjukdomar

Upper airway surgery in obstructive sleep apnoea -
descriptive, observational and randomised controlled studies

AKADEMISK AVHANDLING
som för avläggande av medicine doktorsexamen vid Karolinska Institutet offentligen försvaras på svenska språket i föreläsningssal B64, Barngatan 4, plan 6, Karolinska Universitetssjukhuset, Huddinge

Fredagen den 22 november 2013, kl 09.00

av

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Stockholm 2013

ABSTRACT

Obstructive sleep apnoea syndrome (OSAS) is a general health problem which causes daytime sleepiness, impaired quality of life and increased morbidity and mortality. A narrow upper airway anatomy is a common cause of OSAS, and tracheostomy was the initial surgical treatment for OSAS. During the 1980s and 1990s uvulopalatopharyngoplasty (UPPP) was the predominant treatment before continuous positive airway pressure (CPAP) and mandibular retaining devices (MRDs) became available in Sweden. The degree of evidence for the efficacy of surgical treatments, especially UPPP, has been very low so far. The results have also varied, depending on the selection of patients and the surgical method. Therefore, randomised controlled trials (RCTs) and long-term follow-up studies in this field have been called for. This thesis evaluates the long-term findings after UPPP in unselected patients, as well as tracheostomy and UPPP (modified, conservative technique) as treatments in selected OSAS patients who have failed other non-surgical treatments and therefore risk remaining untreated.

In Paper 1, a retrospective cohort study of 10 severe and obese OSAS patients, the tolerability of custom-made tracheostomy tubes, nocturnal respiration and excessive daytime sleepiness (EDS) symptoms were evaluated. Eigth tolerated the tube for more than 6 months. The oxygen desaturation index (ODI_4) decreased from 81 (range 55–126) to 13 (1–87) and EDS measured with the Epworth Sleepiness Scale (ESS) was reduced from a median of 18 (8–23) to 5 (0–7). Tracheostomy served as a link to other OSAS treatments.

Paper 2 was a 15-year follow-up of 50 OSAS patients after UPPP. In all, 13 patients had died; 26 patients underwent polygraphy recordings. The median ODI_4 had decreased from 26.5 (range 4–82) to 8.5 (0–60) ($p < 0.01$), a mean reduction of 52%. Sixty-five per cent of patients satisfied the success criteria. One third were objectively categorised as non-snorers. The median BMI was unchanged. The questionnaires were answered by 32 of 37 patients; 88% reported improved or cured EDS and 78% were satisfied. The median ESS score 15 years after UPPP surgery was 6 (0–19). Pharyngeal disturbance ratings were low. The standardised mortality rate did not differ from that of the general Swedish population.

Paper 3 was a prospective RCT called Sleep apnoea Karolinska UPPP ($SKUP^3$), with two parallel arms and stratification by Friedman stage and BMI. Sixty-five consecutively included patients with moderate to severe OSAS, BMI < 36 kg/m^2, ESS ≥ 8, Friedman stage I or II. Sixty-five patients were randomised to intervention (UPPP) or control (expectancy and UPPP after a delay of six months). The mean AHI measured by polysomnography in the intervention group had significantly decreased by 60%, from 53.3 (sd 19.7) to 21.1 (16.7). In the control group, the mean AHI decreased by 11%, from 52.6 (21.7) to 46.8 (22.8), a significant difference between the groups. The mean time in the supine position and BMI were unchanged in both groups. Subgroup analyses of Friedman stage, BMI group and tonsil size all showed significant reductions of AHI in the intervention group, compared to controls. There were no severe complications after surgery.

In Paper 4 the same $SKUP^3$ subjects were evaluated concerning changes in the ESS and the quality of life, as well as in vigilance tests. The mean ESS in the intervention group decreased significantly from 12.5 (sd 3.2) to 6.8 (3.9), but there was a non-significant change in the control group. Significant differences between groups in favour of UPPP involved changes in the ESS, several SF-36 domains (general health, vitality and social functioning), as well as in sleep latency. Changes in the ESS correlated significantly with changes in vitality, social functioning and sleep latency, as well as with changes in the AHI, nadir O_2 and the arousal index.

In summary, tracheostomy may constitute an alternative treatment in obese patients with severe OSAS. The improvements in nocturnal respiration and daytime sleepiness after UPPP appeared to remain stable after 15 years. UPPP may also have a protective role against mortality. The $SKUP^3$ showed that modified UPPP significantly improved respiratory parameters, daytime sleepiness and the quality of life, compared to controls. Since upper airway surgery appears to be effective and safe, it should be offered to selected OSAS patients.

ISBN 978-91-7549-367-1