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Short Communication

# Somno-Esophagoscopy III - The ENT-Specialist, Doorkeeper of Aerodigestive Tract

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Croft and Pringle were first to propose a sleep endoscopic procedure in 1991 [1] in drug induced sleep "DISE". Since they used first midazolam as a sedating agent, the procedure was named "MISE" midazolam induced sleep endoscopy. Today propofol is the preferred narcotic agent to allow for naso-pharyngo-laryngoscopy by means of a fiberoptic endoscope or chip on tip video-endoscopes.

Videosomnoscopy (VSS) is nowadays an established and in the meantime accepted diagnostic tool in treatment and investigation of OSA. At the same time our knowledge about the role of reflux disease in airway disorders like UARS and OSA has improved substantially [2]. Gastroesophageal reflux (GERD) and extra-esophageal reflux (EERD) are often coincident in OSA patients and play to our opinion a major role, especially in advanced sleep apnea. Even so newer reports suggest that incidence of reflux could be lower during sleep, we believe that reflux disorders like GERD, EERD, LPR are in part caused by intrathoracic pressure changes, induced by obstruction disordered breathing in OSA and even UARS. Intrathoracic negative pressure can lead to invagination of gastric cardia into terminal esophagus and thus possibly promote formation of axial hernia. During our investigations in more than 3600 somnoscopies since 1996, we began 2012to perform somno-esophagoscopy in patients with OSA and UARS.

In 2013 we presented a new endoscopic technique at the 84th Annual Meeting of the German Society of Oto-Rhino-Laryngology, Head and Neck Surgery and named it Videosomno-esophagoscopy [3]. We conducted 376 VSES in our unit. 301 of them had been carried out after Videosomnoscopy (VSS), using a 4,9 mm children gastroscope to perform both procedures. We found, especially in OSA patients with reflux symptoms, in almost all cases a more or lesser pronounced invagination of cardia and fundus mucosa into terminal esophagus, indicating a major role of supraglottic obstruction (SGO) in development of axial hernia. In addition, we found that invagination was more pronounced in patients with SGO on epiglottis level, than other obstruction levels, like soft palate or base of tongue. When obstruction suspends, the invagination will suspend also.

At the 2014 meeting we presented first findings, using the new endoscopic technique: "Videosomno-esophagoscopy II (VSES II) - what is the genesis of axial hernia?" [4] we provided a teaching video about VSES, performed in our unit. All of them had been carried out after conventional VSS, using again the 4,9 mm children gastroscope (Olympus GIF N 180) to perform both procedures. Even though handling an ultra-thin gastroscope for VSS and upper digestive tract is more challenging, the learning curve for ENT-endoscopists is steep and results impressing. We found, especially in OSA patients with reflux symptoms, in all cases a more or lesser pronounced invagination of cardia and fundus mucosa into terminal esophagus, raising suspicion that obstruction plays a major role in the development of axial hernia. More than that, we found that invagination occurred particularly and more pronounced in patients with supraglottic obstruction on epiglottis level, than other obstruction levels like soft palate or base of tongue. When obstruction suspends, the invagination phenomenon will no longer be detectable in these patients. In a meantime large number of cases we performed surgical treatment of adult SGO either by means of

surgical reduction of Epiglottis, or by using an operation technique to enlarge posterior airway space, hyoidpharyngoplasty with quite remarkable results [5,6].

In a follow up poster publication, we reported about, in VSES detected, cases of severe, obstruction induced invagination phenomenon [7], leading to spontaneous regurgitation and vomiting up to 8 times/day (1 patient). All 3 adult patients were diagnosed for cyclic vomiting syndrome, first described by Samuel Gee in 1882 in children, probably caused by supraglottic obstruction at epiglottis level (adult acquired laryngomalacia) and received Laser assisted epiglottis partial resection (LAEPR). Emesis disappeared completely in 2 cases and suspended sub-totally in 1 case. The latter, a female, had to be re-operated 2 years later and since then was free of complaints (not published). We believe, that cases of chronic (cyclic) vomiting syndrome (CVS) might be linked to supraglottic obstruction and could be accessible to surgical therapy of an undue large epiglottis, as present in all 3 published cases [4]. Since grunting, dyspnea and reflux are complaints, that might be associated to CVS, it may be speculated that supraglottic obstruction could possibly play a role in some cases of cyclic vomiting in children and infants [8].

## Endoscopy technique

Principally, after conventional somnoscopy, VSES can also be carried out using a thicker (max 8mm) gastroscope, but the width of the instrument disturbs induced sleep and may also impair results by altering position of larynx and reducing or even increasing obstruction on supraglottic level, since the instrument cannot be inserted trans nasally, but only using oropharyngeal route. Therefore, the use of a low diameter, nasogastric route insertable gastroscope is recommended for exertion of VSES. To our believe, VSES could be a reasonable tool to further investigate the interrelations between OSA and reflux diseases of upper digestive tract.

The procedure is performed as follows: at first decongestion and superficial anesthesia with a 50/50% mixture of Naphazoline (Privin®) and Lidocain 2%, used as spray and soaked cottons, to be left in the nasal cavity for at least 15 min. The patient lying supine on endoscopy/OR-table then receives propofol or midazolam intravenously. The depth of narcotic sleep should be monitored by an anesthetist and a device to measure depth of narcotic sleep e.g., Narcotrend® or other. A short termed apneic episode is normal and waiting until normal breathing is perceived is mandatory. Continuous application of narcotic is preferable when using Propofol for induced sleep.

Now the cottons can be removed and the 4,9 mm Endoscope trans nasally inserted. We strongly advice to perform endoscopy in the so called "surgical position", standing on the "head end" of operation table, like doing straight endoscopic ENT-procedures like micro-laryngoscopy etc. This position has several important advantages: 1. A laterally correct view, 2. a relaxed position of endoscopist, 3. movements of supraglottic structures, especially Epiglottis can be evaluated better, e.g., the so called "suck in" phenomenon of the epiglottis is noted as "falling down", thus occluding the airway. 4. Also the "suck in," phenomenon of hypertrophic arytenoid mucosa in obstructive breathing/snoring, can to our experience, only be correctly recognized and evaluated in surgical view during sleep endoscopy, since the angulation of the flexible scope is more favorable, as shown in our video.

In summary evaluation the ENT specialist might indeed be the true doorkeeper of, as well upper airway, as upper GI-tract, since he/she is able to identify and evaluate the interrelations of upper airway and upper GI tract patho-physiology. Until we are able to get a shorter ca 110 cm long special esophago-gastroscope for ENT doctors, using an ultrathin children gastroscope for both procedures is the clue and the door opener to a new world of sleep endoscopic encounters, that might impact our current line of action in treating sleep apnea and reflux diseases like GERD, EERD and LPR.

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