SNORING & OSAHS SURGERY

International Workshop
WORKSHOP INTRODUCTION

Yassin Bahgat
STAFF MEMBERS

- 14 ENT Surgeons Staff Members
- 3 ENT Residents
- 2 Oral Surgeons
- 1 Psycologist
- 1 Speech Therapist

"If I have seen further it is by standing upon the shoulders of giants"
Sir Isaac Newton, 1676
Our SDB Surgery Experience

- 15 years
- 1400 Operated Pts
- > 3000 Procedures (Wide Range of Types)
- 15-20 new referred cases / week
- 5-10 new PSG / week
- 3-9 new surgical procedures / week
- Academic Activity (ENT Pavia, MFS Parma)
- Scientific Activity (AIMS, AOOI, SIO)

Italian Workshop Faculty

- Claudio Vicini MD
- Filippo Montevecchi MD
- Pietro Canzi MD
ALEXANDRIA WORKSHOP ON
SNORING & OBSTRUCTIVE SLEEP APNEA SURGERY

COURSE DIRECTOR: Yassin Bahgat, MD  Claudio Vicini, MD
COURSE BOARD: Filippo Monteverchi, MD  Pietro Canzi, MD

TOPICS:

- Course Presentation and General Overview (Bahgat)
- Basic Phenomena, Respiratory Events, Syndromes & Complications (simple snoring, UARS, OSAS, stridor) (Vicini)
- SRDB Epidemiology (Canzi)
- Preoperative Diagnostic Protocol (Monteverchi)
- Sleep Endoscopy (Monteverchi)
- Sleep Studies Made Easy (for the ENT Surgeon) (Vicini)
- SDB Surgery – General Overview; Alternative conservative options (Vicini)
- Oropharyngeal Surgery (Monteverchi)
- Hyoid Surgery (Vicini)
- Minimally Invasive surgery (Monteverchi)
- Classical Base of the Tongue Surgery (Canzi)
- TORS (Robotic Surgery) (Vicini & Monteverchi)
- Maxillo-Mandibular Advancement (Vicini & Canzi)
- Skin Lined Tracheostomy (Canzi)
- Complications Avoidance Strategy, Post-op assistance (Vicini)
- Follow up and outcomes evaluation (Canzi)

REGISTRATION:

- Day I: Scientific session (Free)
  April 9th, 2009, at Palestine Hotel
- Day II: Live surgery ($500 LE)
  April 10th, 2009, at the Alexandria Main University Hospital

FOR MORE INFORMATION, PLEASE CONTACT:

Professor Yassin Sollman Bahgat
Address: 612 El Horeya St, Zizania, Alexandria, Egypt
Mobile: +2010 14007002
Telephone: +203 5881880
Mail: yassinbahgat@hotmail.com
We hope that you enjoy the Workshop and ...

We apologise for our poor language!

SNORING & OSAHS SURGERY

International Workshop
Basic Phenomena, Respiratory Events, Syndromes, Consequences & Complications

>15 min

Claudio Vicini M.D.

Department of Special Surgery
Head & Neck Surgery, Oral Surgery Unit
(Head: C. Vicini)

G.B. Morgagni – L. Pierantoni Hospital
ASL of Forlì
ITALY

University of Pavia
School of Medicine
ENT Clinic
Rochopathy Surgery Course

University of Parma
School of Medicine
Maxillo-Facial Clinic
SDB Surgery Course

AIMS Board
&
ENT-MaxilloFacial
Joint Commission
CONCEPTS DEFINITION
update 2008

What are we going to treat?

CONCEPTS

- Basic Phenomena
- Respiratory Events
- Syndromes
- Consequences
- Complications
Basic Phenomena in SDB

- **Vibration** (mucosa)
- **Obstruction** (muscle and other tissues)

Vibration & Obstruction in different combinations in time and space domains contribute to build up …
Respiratory Events in SDB:

- Snoring
- RERA
- Hypopnea
- Apnea
- Choking
- Stridor et alia
- Hypoventilation?

Respiratory Events in different combinations contribute to build up ...
Syndromes after Fairbanks, 2003, modified

- Simple or Socially Unacceptable Snoring
- UARS
- OSHS
- OSAS
- OSAHS
- Mixed SAS
- Obesity-Hypoventilation Syndrome
-Overlap Syndrome
- Stridor

Consequences

- Uvula & Palate Edema
- Arterial Hypertension
- Excessive Daytime Sleepiness
Complications

- Local: Uvula Apoplexy
- General CV: (AMI, stroke, aritmia, death during sleep, etc.)
- General Neuro Psyco: (cognitive disturbances, mood alterations, etc.)
- General Others: (choking, sexual impotence, nicturia, seizures, car or work accident, etc.)

“NOT SIGNIFICANT”
OBSTRUCTIVE
Snoring
Snoring: ext

Snoring: int
SNORING: main features

- Ritmic Acoustic phenomenon syncronised with breathing cycle
- Variable Physical Features
- Mucosal component
- Luminal component (secretions!)
- Variable vibrating site/s
- Cross-section reduction (Bernoulli effect)
- No Significant Flow Reduction
- Self Aggravating
- Mechanical Damage (edema, neuropathy)
- No general physical damage
- Heavy relational implications
- Evolution?
“SIGNIFICANT” OBSTRUCTIVE EVENTS

RERAs, Hypopneas, Apnoeas
How to measure obstruction or flow reduction?

VIII. RESPIRATORY RULES

RESPIRATORY RULES FOR ADULTS

A. Thermistor

1. TECHNICAL CONSIDERATIONS

   A. The sensor to detect absence of airflow or identification of an apnea is an oronasal thermal sensor.
   B. The sensor for detection of airflow or identification of hypopnea is a nasal air pressure transducer with or without square root transformation of the signal.
   C. The sensor for detection of respiratory effort is either esophageal manometry, or calibrated or uncalibrated inductance plethysmography.
   D. The sensor for detection of blood oxygen is pulse oximetry with a maximum acceptable signal averaging time of 3 seconds.

   Notes:
   1. Alternative sensors are to be used when the signal from the recommended sensor is not reliable.
   2. The alternative signal to detect absence of airflow for identification of an apnea when the thermistor signal is unreliable is a nasal air pressure transducer.
   3. An alternative sensor for detection of effort is diaphragmatic/muscosternal EMG.
   4. For scoring of hypopnea when the nasal pressure device is not functioning, alternative sensors including uncalibrated or calibrated inductance plethysmography or an oronasal thermal sensor may be used.
   5. A small bias i.e. more events in reporting hypopneas at the flow threshold recommended for scoring hypopneas (≥50% of baseline), may be corrected by square root transformation.

Thermistor
Flow Sensors: Nasal Cannula Pressure Transducer
**APNEA**

AASM Scoring Manual 2007

*(Rule VII. 3.A Recommended)*

**Flow reduction**

\[ \geq 90\% \]

**During the whole event**

\[ O_2 \text{ Desaturation and/or EEG Arousal not necessary} \]

**Duration** \[ \geq 10 \text{ sec} \]

---

**APNEA**

AASM Scoring Manual 2007

**CENTRAL**

**MIXED**

**OBSTRUCTIVE**

*(Rule VII.3.B Recommended)*

**Distinction between 3 types of:**

**RESPIRATORY EFFORT**

by

- PES
- Inductive Pletismography
- Intercostal EMG
APNEA – from outside

APNEA – inside view
Obstructive Non-Apneic Respiratory Events (ONAREs)

Characterization of Obstructive Non-Apneic respiratory Events in Moderate Sleep Apnea Syndrome
C. Cracowski, JL Pepin, B Wuyam, P Levy

- OBSTRUCTIVE HYPOPNEAS
- RESPIRATORY EFFORT RELATED AROUSALS (RERAs)

"are clinically important as producing sleep fragmentation but are much more difficult to detect and classify than obstructive apneas"

HYPOPNEA - A
AASM Scoring Manual 2007

(RULE VII. 4. A Recommended)

Flow reduction $\geq 30\%$

$+$

O2 Desaturation $\geq 4\%$

EEG
Arousal not necessary

Duration $\geq 10$ sec
HYPOPNEA - B

(RULE VII. 4. B Alternative)

Flow reduction  \( \geq 50\% \) 

O2 Desaturation \( \geq 3\% \) 

or

EEG Arousal

Duration \( \geq 10 \text{ sec} \)

SLEEP RESPIRATORY EVENTS

AASM Scoring Manual 2007

HYPOPNEA
(2 criteria)

RULE VII. 4. A
RECOMMENDED

RULE VII. 4. B
ALTERNATIVE

Criteria Specification is mandatory!
SLEEP RESPIRATORY EVENTS
AASM Scoring Manual 2007

HYPOPNEA
CENTRAL
MIXED
OBSTRUCTIVE

3 types:
According to the respiratory effort measure

- PES
- Inductive Pletismography
- Intercostal EMG

Respiratory Effort-Related Arousal (RERA)
AASM Practice Parameters Indications for PSG (Sleep 2005; 4)

- clustering of respiratory acts with progressive increase of respiratory effort and final arousal (registered by Pes)
- duration \( \geq 10 \) seconds
- Flow reduction \(< 30\%\)
- No \( \text{P O}_2 \) e heart rate modification

After Guilleminault C. et al. 1995
RERAs and Flow Limitation Events (FLE)

- Flow Limitation Events
- Clustering of respiratory acts with progressive flattening of inspiratory curve (registered by nasal cannula)

Quick stopping with restoring of normal sinusoidal shape

Duration \( \geq 10 \) seconds

\[ \text{FLE} = \text{RERA} \]

Ayappa I et al. Sleep 2000;23:763-71

---

**Obstructive Respiratory Events**

*Update 2008*

- **Apnea (AHI)**
- **Hypopnea**
- **RERA (Respiratory Event Related to Apnea)**
- **SNORING**

**Events according to severity**

- \( >10' \), des \( >3\% \) o arousal EEG
- \( >10' \), des \( >4\% \)
- \( >10' \), flow lim*, arousal EEG
- No flow lim, arousal, des, aritmia

*(Flow Reduction %)*
Less Common Situations

Choking, Stridor, Groaning, Bruxism
STRIDOR IN Multi Systemic Atrophy
SLEEP RELATED BREATHING DISORDERS IN MSA (Vetrugno & Coll., 2007)

- Nocturnal tachypnea
- Snoring
- Nocturnal paradoxical breathing
- OSAHS
- Dysrhythmic breathing (Cheyne-Stokes and others)
- Central apnoea
- STRIDOR
Sleep-related stridor due to dystonic vocal cord motion and neurogenic tachypnea/tachycardia in multiple system atrophy.


Department of Neurological Sciences, University of Bologna, Bologna, Italy.

vetrugno@neuro.unibo.it

Sleep-disordered breathing and sleep-related motor phenomena are part of the clinical spectrum of multiple system atrophy (MSA). Stridor has been attributed to denervation of laryngeal muscles or instead to dystonic vocal cord motion. We studied 3 patients with nocturnal stridor in the setting of MSA. All patients underwent nocturnal videopolysomnography (VPSG) with breathing and heart rate, O(2) saturation and intra-esophageal pressure recordings, and simultaneous EMG recordings of the posterior cricoarytenoid, cricothyroid, and thyroarytenoid muscles and continuous vocal cord motion evaluation by means of fiberoptic laryngoscopy. VPSG/EMG and fiberoptic laryngoscopy documented normal vocal cord motion without denervation during wake and stridor only during sleep when hyperactivation of vocal cords adductors appeared in the absence of significant O(2) desaturation. All patients had tachycardia and tachypnea and paradoxical breathing during sleep, erratic intercostalis and diaphragmatic EMG activity and Rem sleep behavior disorder. One of the patients had restless legs syndrome with periodic limb movement during sleep and excessive fragmentary hypnic myoclonus. In conclusion, our patients with MSA had nocturnal stridor due to sleep-related laryngeal dystonia. Stridor was associated with other abnormal sleep-related respiratory and motor disorders, suggesting an impairment of homeostatic brainstem integration in MSA.
1. Vocal cord adductors muscles (CT&TA) abnormal persistent tone
2. Phasic inspiratory activation

Paradoxical Vocal Cord Inspiratory Motion (PVCM)

- Reflex adductor activation
- Glottis narrowing
- Bernoulli effect
- Reactive powerful negative P in trachea

SLEEP ENDOSCOPY in MSA

Shiba & Coll., 2007

Glottal narrowing during inspiration
Nothing else than snoring or stridor?

Other possibilities?
Nocturnal Groaning

or

Catathrenia

A new entity in Parasomnias Area

Vetrugno & Coll., 2001
Oldani & Coll., 2005
Bruxism

Another different nocturnal noise …

Syndromes

after Fairbanks, 2003, modified

- Simple o Socially Unacceptable Snoring
- UARS
- OSHS
- OSAS
- OSAHS
- Mixed SAS
- Obesity-Hypoventilation Sy
- Overlap Syndrome
- Stridor
SIMPLE SNORING

- Snoring, Simple Snoring, Primary Snoring Disorder, Socially Disruptive Snoring
- Continuous Snoring
- No other complaint
- AHI < 10 (5)
- No EDS or other NPs complaints
- No CV problems
- Family or Social Problems
- Evolution to OSAHS?

OSAHS

- Obstructive Sleep Apnea Hypopnea Syndrome
- Intermittent snoring
- EDS & Cognitive Alterations
- AHI > 10
- if AHI>20 EDS not required
- Slight 10-20 5-15
- Medium 20-30 15-30
- Severe >30 >30
Upper Airway Resistance Syndrome (UARS)

- Every night Snoring
- EDS
- Female, not obese
- AHI < 5
- PO2 within the norms

Clinical-PSG pattern:

- Clustering of respiratory acts with progressive increase of respiratory effort and final arousal (registered by Pes)
- EEG Arousal

Auguste Dupin is a man in Paris who solves the mysterious brutal murder of two women. Numerous witnesses heard a suspect, though no one agrees on what language was spoken. At the murder scene, Dupin finds a hair that does not appear to be human.

The Murders in the Rue Morgue

Edgar Allan Poe, 1841
THANK YOU FOR YOUR ATTENTION ... and