OLIVE VIEW-UCLA MEDICAL CENTER
RESPIRATORY CARE SERVICES – SLEEP MEDICINE
POLICY & PROCEDURE

NUMBER: 9016
VERSION: 2

SUBJECT/TITLE: PROTOCOL FOR CPAP TITRATIONS

POLICY: All individuals who record sleep studies must follow best practices for CPAP titrations in order to attain the ideal pressure setting for their patients. Too low of pressures may cause patients to either be sub optimally treated or to wake up in a panic. Too much pressure may cause the patient to experience bloating or mask leakage. Determining the appropriate pressure setting for each patient will lead to improved adherence and outcome. CPAP titrations are not an exact science, and it is understood that technologists may need to make minor changes for individual patients. The procedure below is meant as a guideline.

PURPOSE: In order to provide the highest quality care for our patients, our sleep disorders center adheres to the AASM Standards of Accreditation. The accompanying policy and procedure on CPAP titrations follows the spirit of the Clinical Guidelines for the Manual Titration of Positive Airway Pressure in Patients with Obstructive Sleep Apnea. We recognize that the guidelines from this 2008 consensus paper are non-binding, and that there may be some minor deviations found in our policy.

DEPARTMENTS: RESPIRATORY CARE SERVICES

DEFINITIONS: CPAP-Continuous Positive Airway Pressure

1.0 Positive airway pressure (PAP) is a standard treatment for patients with obstructive sleep apnea (OSA), a sleep related breathing disorder characterized by full or partial occlusion of the upper airway during sleep. Standard sleep medicine practice involves manual pressure adjustment by a sleep technologist during attended laboratory polysomnography (PSG) to eliminate obstructive respiratory-related events (apneas, hypopneas, respiratory effort-related arousals-RERAs, and snoring).

2.0 A PAP delivery system consists of three main components: a PAP device; a nasal, oral, or oronasal interface (i.e., nasal mask, nasal pillows, full-face mask) held snug to the face by headgear; and a flexible hose that connects the device to the interface. A PAP device is basically an air pump (fan-driven or turbine system) that draws in external, filtered air and delivers pressurized airflow, which is adjustable by varying the pressure valve diameter or fan/turbine speed.

3.0 PAP devices are divided into four basic types depending on their pressure delivery system:

(1) continuous positive airway pressure (CPAP), which delivers a single, fixed pressure to the patient during the night
(2) bilevel positive airway pressure (BPAP), which delivers a higher inspiratory PAP (IPAP) than expiratory PAP (EPAP)
(3) autotitrating positive airway pressure (APAP), which automatically increases CPAP or BPAP (IPAP/EPAP) as needed to maintain airway patency and then decreases the pressure if no abnormal respiratory events are detected within a set period of time.
(4) adaptive servoventilation (ASV), which uses a servocontroller that automatically adjusts pressure by breath-by-breath analysis to maintain a steady minute ventilation especially in heart failure patients with central sleep apnea and/or Cheyne-Stokes respiration.

The 2008 American Academy of Sleep Medicine (AASM) clinical guidelines indicate that manual titration of PAP pressures during attended polysomnography is the current standard for selection of the optimal patient therapeutic pressure. PAP devices must be administered and titrated by a well-trained sleep technologist.

SCOPE:
This guideline is based on the 2008 AASM Clinical Guidelines. The scope of this guideline is restricted to adult (>12 years) and pediatric (<12 years) patients with obstructive sleep apnea; these recommendations do not apply to such conditions as neuromuscular disease or intrinsic lung disease. This guideline does not cover PAP titration in the home, nor the use of servoventilation or auto-titrating devices.

1. Indications for Positive Airway Pressure
PAP is indicated for patients who are diagnosed with mild, moderate or severe OSA.

Adult >= 12 years	mild	moderate	severe
AHI	5 to < 15	15 to 30	> 30
Children < 12 years	mild	moderate	severe
AHI	1 to < 5	5 to < 10	> 10

PROCEDURE:

1.0 Review the Dr.'s orders and then the patient's clinical note for pertinent history.
2.0 Review the patient's previous sleep study or studies to assess the severity of sleep-disordered breathing, the type of respiratory events, and the position & stage at which the events were most severe. This will help to attain a better titration.
2.1 Example: If the patient's sleep-disordered breathing was worse in the supine position, you

would want to make sure the patient stayed in the supine position as much as possible; or, if it was worse during REM sleep, you would want to minimize sleep disruption so that they can achieve and maintain REM sleep.

3.0 Application of electrodes, montages, filters, sensitivities, and scoring will be performed according to **The AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications Version 2.0.**

4.0 Begin the patient on a setting of 4-5 cm of water. If the patient is morbidly obese or unable to fall asleep on the setting of 4-5cm of water, higher starting pressures may be needed.

5.0 If apneas or frequent hypopneas are present, pressure settings should be increased by 2 cm of water. If occasional hypopneas, snoring, or mask flow limitation (see below) are present, pressure settings should be increased by 1 cm of water and maintained for at least 5 minutes to determine if events improve or resolve. Pressure settings may need to be increased more quickly during REM sleep given the limited amount of REM during sleep and the need to treat events during this stage.

6.0 If a mask leak occurs, the tech should first fix the leakage before raising the pressure. Otherwise, the final pressure setting chosen for the patient may be too high. Once the mask leak has been fixed, decrease the pressure to the last setting where mouth breathing and/or mask leakage was not present, and then re-titrate as indicated. Make sure to document directly on the study the steps taken to resolve the leak, and the type of masks used. Pressure settings usually do not need to be set as high with a nasal mask than with a full-face mask.

7.0 The recoding technologist should document directly on the study at least every 30 minutes.

8.0 If the patient takes a break from wearing the mask, do not decrease the CPAP pressure on attempted return to sleep unless the patient remains awake for 15 minutes, or the patient specifically requests that the pressure be lowered.

9.0 Do not raise pressure settings for central apneas. If the patient develops central apneas, pressure setting may need to be lowered.

10.0 If the patient is unable to tolerate CPAP secondary to 1.) Persistent mouth breathing despite use of a full-face mask/chin strap; 2.) Inability to exhale against higher expiratory pressures (typically beginning anywhere from 15 to 20 cm of water); or, 3.) Has frequent central apneas; the use of bi-level positive airway pressure may be indicated. Make sure to document directly on the study why the patient is being switched from CPAP to bi-level.

11.0 Ensure that supine sleep has been seen on the chosen setting. Going above the chosen setting by 1 or 2 cm of water to show range may be helpful to ensure that the correct pressure has been established.

Description and Methodology for Manual PAP Titration

The following titration protocols should be used as a guideline in conjunction with sleep center protocols to attain an appropriate titration for each individual patient. Significant variation from the protocol should be documented with appropriate rationale

CPAP Titration

Patients < 12 years old	Patients >= 12 years old
CPAP minimum = 4 cm H_20	CPAP minimum = 4 cm H_2O
CPAP maximum = 15 cm H_20	CPAP maximum = 20 cm H_20

Increase pressure by a minimum of 1 cm H_20 with an interval of no less than 5 minutes when you see the following:

Patients < 18 years old	Patients > 18 years old
1 obstructive apnea	2 obstructive apneas
1 hypopnea	3 hyponeas
3 RERAs	5 RERAs
1 min. of loud or unambiguous snoring	3 min. of loud or unambiguous snoring

Level of Titration Achieved

You have achieved an **optimal** titration when you see the following:

a. The Respiratory Disturbance Index (RDI) is <5 per hour for a period of at least 15 minutes at the selected pressure and within the manufacturer's acceptable leak limit.
b. The SpO_2 is above 90% at the selected pressure.
c. Supine REM sleep at the selected pressure is not continually interrupted by spontaneous arousals or awakenings.

You have achieved **good** titration when you see the following:

a. The Respiratory Disturbance Index (RDI) is <10 per hour (or is reduced by 50% if the baseline RDI was <15) for a period of at least 15 minutes at the selected pressure and within the manufacturer's acceptable limit.
b. The SpO_2 is above 90% at the selected pressure.
c. Supine REM sleep at the selected pressure is not continually interrupted by spontaneous arousals or awakenings.

You have achieved an **adequate** titration when you see the following:

a. The Respiratory Disturbance Index (RDI) is NOT <10 per hour but the RDI is reduced by 75% from baseline.
b. Criteria for optimal or good titration is met but you did NOT get a sample of supine REM at the selected pressure.

An unacceptable titration does not meet any of the above grades.
Repeat titration should be considered.

References:	
Approved by: Jeanne Wallace (Division Chief)	Date: 09/27/2017
Review Date: **09/27**/2020	Revision Date:
Distribution: Respiratory Care	