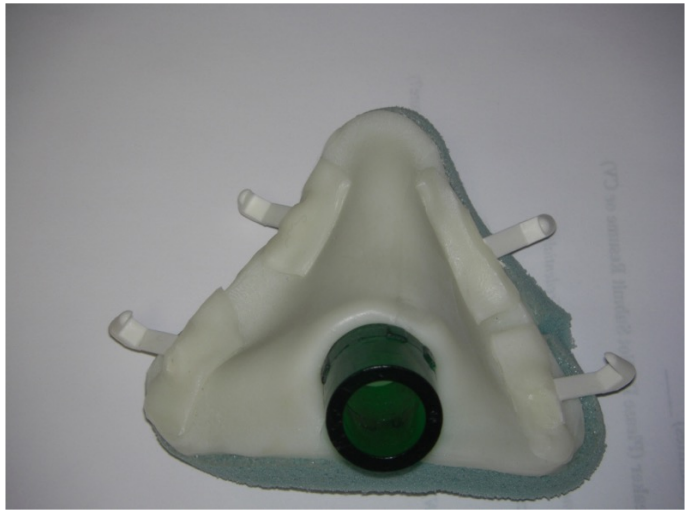
PAP Treatment for OSA

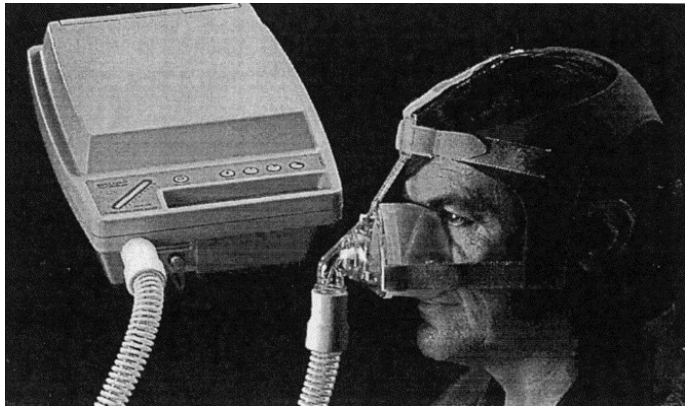
Overview

- Introduced in 1981 but was not more widely recognized as form of long-term therapy until 1985
- First CPAPs required adhesive to attach the mask
  - Machines very large and clunky
- Gold standard for treatment for moderate to severe OSA

Overview


Treats Obstructive Sleep Apnea symptoms noninvasively:
Immediately reduces number of apnea episodes
Minimizes desaturation and its effects
Decreases wake time somnolence in patients
Provides comfortable home treatment for long-term patient compliance
RESPIRONICS
SleepEasy™
Nasal CPAP System
RESPIRONICS INC





Nasal CPAP

- First description of CPAP: Pneumatic splint to prevent collapse of pharyngeal airway
- Increases airway volume and area
- Effective for eliminating obstructive and mixed apneas
  - Some central events may be corrected if obstructive events are predominant
- Only a treatment, not a cure for OSA

Practical Aspects of Treatment

- Most patients start CPAP under medical supervision
  - Supervision ensures:
    - Patient education on therapy
    - Best estimate of prescribed pressure
    - Proper mask fit
    - Problems are addressed
      - Side effects
      - Claustrophobia
- Patient needs to be assessed prior to initiation of CPAP

First Night

- It is good for labs to provide the following to CPAP patients:
  - Explanation of therapy
  - Demonstration videos
  - Sessions for mask acclimation
- On first night of treatment, it is important to ensure pressure level is the most therapeutically effective to prevent apneas, hypopnea, and O2 desats during all sleep stages and in all sleep positions

First Night

- Important to correct flow limitation
- Once correct pressure reached and airway optimally open, sleep fragmentation should go away
  - May be rebound of N3 and REM sleep
    - Rebound period lasts about a week after CPAP therapy initiation
- If continued arousals persist, may be due to:
  - Inadequate pressure
  - Mask leaks
- CPAP pressure needs vary by patient
  - Factors affecting pressure needs include weight, heavy alcohol consumption, nasal congestion, patient resistance

Split Night Studies

- First part of night is diagnosis, second part is treatment
- Typically affects severe patients
- Benefits
  - Diagnosis and treatment in same night
  - Cost-saving
  - Allows severe patients to start therapy sooner
- Problems
  - Question over sufficient time to titrate

Determining the Optimal Setting

- Optimal setting = Minimal pressure required to resolve all apneas, hypopneas, snoring and arousals in all stages of sleep and in all body positions
  - Goal is no events in supine REM
- Four categories of PAP efficacy:
  - Optimal = RDI < 5 for at least 15 min and includes supine REM
  - Good = Reduces RDI ≤ 10 or by 50% if baseline RDI < 15 and includes supine REM
  - Adequate = Doesn't reduce RDI ≤ 10 but reduces RDI by 75% from baseline—OR—criteria for optimal or good achieved minus supine REM
  - Inadequate = Meets none of the above criteria

Problems / Side Effects

- Side effects reported by patient are related to:
  - Pressure or airflow
  - Mask-nose interface
- Nasal congestion
  - Common side effect
  - CPAP can lead to vasodilation and mucus production
  - Patient starts mouth breathing so chin strap may need to be introduced
  - Heated humidification helps

Problems / Side Effects

- Interface
  - Comfort a key for compliance
  - Poor fit = leaks
  - Claustrophobia
  - Patients with no upper front teeth have difficulties with nasal CPAP
- Pressure level and airflow
  - Trouble exhaling
  - Ramps
  - Air temperature

Adherence

- General Issues
  - 40-50% of patients do not use oral medications and inhalers as prescribed
    - Number for CPAP compliance no different than this
  - Physicians can't predict who will be compliant
  - Factors that improve adherence:
    - Simplicity of treatment regimen
    - Family support
    - Patient's perception that OSA is serious
    - Belief that CPAP will be effective
    - Patient understanding rationale of treatment
    - Provision of accurate details of treatment planned
    - Close patient-clinician relationship

Adherence

- Adherence and CPAP
  - Several factors affect adherence:
    - Machine cost
    - Technical advances in equipment
    - Prescriber motivation
  - Average nightly CPAP use is less than 4 hours per night
  - 1 night off CPAP led to a recurrence of EDS

Adherence

- Interventions that can improve PAP adherence:
  - Education and supportive care
  - Behavioral therapies
  - Heated humidification
  - Advanced PAP (bi-level PAP, EPR, and APAP)
  - Mask type
  - Hypnotics
  - Telemedicine
  - Adherence monitoring
  - Sleep specialist care

Autotitrating CPAP

- Can adjust to patient needs throughout night
- No difference in compliance from traditional CPAP
- Not sufficient data to determine whether autotitrating CPAP can replace need for in-lab titrations
- Potential problems:
  - Overtitrating for mask or mouth leaks
  - Undertreatment because of slow or inadequate responses to airway obstruction
  - Presence of central apnea
  - Hypoventilation

Management of CPAP Failure

- CPAP failure is subjective issue
- Definition: “Use of CPAP for < 4 hours per night on 70% of the nights and/or lack of symptomatic improvement”
  - Equates to average of 2.7 hours of use per night
- Non-PAP alternatives need to be discussed with selective patients in timely manner

Complex Sleep Apnea

- Can occur in patients on opiates
- Also affects elderly males
- ASV provides both PAP support to overcome obstructive events during stable breathing when there is adequate respiratory drive and introduces a mode of inspiratory and expiratory ventilatory support to maintain a steady minute ventilation when central apneas evolve

Health Outcomes

- Improves EDS and systemic BP
- May prevent cardiovascular events
- May improve comorbid depression
- Reduced motor vehicle accidents
- Decreases healthcare utilization

CPAP and Heart Failure

- OSA common in cardiac failure patients
- Studies of use of CPAP for 1 month and 3 months show improvement in left ventricular function
- For heart failure and CSA patients, CPAP:
  - Improves inspiratory muscle strength
  - Reduces left ventricular load
  - Increases $PaCO_2$ toward normal levels
  - Decreases norepinephrine concentrations