Optimising Compliance with CPAP for the Treatment of Obstructive Sleep Apnoea in Tetraplegic Patients: Experience Gained from the COSAQ Project at the NSIC

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Introduction
Studies have shown that Obstructive Sleep Apnoea (OSA) is very common in the first year after cervical Spinal Cord Injury (tetraplegia/quadriplegia), affecting up to 80% of patients. Continuous Positive Airway Pressure (CPAP) is currently the only effective treatment of OSA,1-3 but in a recent review only 24% of patients in spinal injury Units were reported to be CPAP compliant.4 CPAP usage by patients participating in the project was reviewed. Data was collected regarding ability to tolerate CPAP for at least 4 hours during a 3 night initial assessment (Resmed S8 or S9 autoset machine with humidifier). As the study progressed, 6 monthly project Key Performance Indicators (KPI) were reviewed: it was noted that the NSIC was successful at maintaining compliance up to and beyond discharge from the NSIC (the new inpatient service team is already making improvements in this area.)

Method and materials
The COSAQ research project was a prospective, randomised controlled trial of Continuous Positive Airway Pressure (CPAP) treatment for Obstructive Sleep Apnoea following tetraplegia. The NSIC is 1 of 15 sites which participated in this international trial. The project leader is Dr David Berlowitz in Melbourne, Australia.

Some patients needed the opportunity to try a different CPAP mask – multiple CPAP mask interfaces were available for clinical research below.

Findings
-Best results for 4 hours initial tolerance of CPAP were obtained by using a simple nasal mask with or without a chin strap for the first night
-2 different chin straps were available to the team – see photos below
-Optimal ongoing compliance required frequent visits (2–3 times a week) from the CPAP physio, particularly during the first 2 weeks on CPAP.
-Some patients needed the opportunity to try a different CPAP mask – multiple CPAP mask interfaces were available for clinical research.
-An ongoing education program for the nursing staff assisting the patients at night.

CPAP therapy initiated by a member of the sleep team
Patient reviewed by a member of the sleep team within 3 days (ideally the next morning) and adjustments made to equipment if needed.
Sleep team review CPAP 2-3 times a week for the first 2 weeks
Once the patient is settled and compliant (min. 4hrs a night, 5 nights a week), weekly review until 6 weeks

Discussion
With the support of appropriately trained staff, it is possible to achieve good compliance with nightly CPAP in tetraplegic patients. A good predictor for long-term compliance was found to be the ability of the patient to get hand to face to negate the mask.

Conclusions
-CPAP usage was monitored closely throughout the 13 week trial, to identify good practice in order to maintain this success.
-CPAP usage data from the CPAP machines was also used to assess on-going compliance, as measured by number of nights CPAP was used for 4 hours or more. In order to obtain meaningful trial data it was necessary to optimize compliance in the CPAP user group, as usage data was monitored closely throughout the 13 week trial, to enable early intervention and support where necessary. As the study progressed, 6 monthly project Key Performance Indicators (KPIs) were reviewed – it was noted that the NSIC success rate for initial CPAP tolerance was high compared with other sites. The NSIC CPAP implementation process was reviewed to identify good practice in order to maintain this success.

References
1. Berlowitz DJ, Brown DJ, Campbell DA, Pierce RJ; Arch Phys Med Rehabil Vol 86, June 2005

Nasal Pillows (Respironics chin strap) Nasal Mask (Resmed chin strap) Full face mask

Translation of research into clinical practice in the NSIC
- The NSIC now has an inpatient sleep service to assess and treat OSA.
- There is an ongoing education program for nursing staff on all wards in the NSIC to support them with nightly CPAP application.
- Experience gained while working on the COSAQ project has enabled us to develop a care pathway for patients undergoing CPAP therapy for OSA on the rehabilitation wards in this spinal unit.

Room for further improvement
- The COSAQ project team were good at getting patients settled on CPAP. However, we were not so successful at maintaining compliance up to and beyond discharge from the NSIC. (The new inpatient service team is already making improvements in this area.)
- The next challenge for the NSIC team is to introduce an outpatient follow up service. Patients with tetraplegia have complex needs, which are not always met in their local hospital.