

# Invasive home mechanical ventilation (I-HMV) experience at a palliative care center

Abdullah Kahraman<sup>1</sup>, Mustafa Özgür Cırık<sup>2</sup>

<sup>1</sup>Atatürk Chest Diseases and Thoracic Surgery Training and Research Hospital, Department of Anesthesiology and Reanimation, Ankara, Turkey

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## ABSTRACT

**Aim:** Although palliative care has recently become widespread in the western countries, it has not fitted on a solid base in our country yet. There is still no consensus on the admission criteria to palliative care units. There is no widely used guidelines for the management of the patients after invasive home mechanical ventilation (I-HMV). In this study, we aimed to share our one-year clinical experience about the patients who were transferred from intensive care unit (ICU) first to palliative care center then home with I-HMV. The demographic and clinical data, education and discharge processes were evaluated.

**Material and Method:** The cases that used HMV used in the palliative care service between January 2016 and February 2017 were retrospectively analyzed. The anesthesiologist was the responsible physician of the palliative care center during this time period. The age, sex, primary diagnosis and comorbidity of the patients were analyzed using statistical methods.

**Results:** Four patients (40%) were female and 6 (60%) were male, the mean age of the patients was 47.9±16.39 years. Amyotrophic Lateral Sclerosis (ALS) was seen in four patients and it was the most commonly encountered indication for admission. The mean duration of stay in our palliative care unit was 19.1±7.22 days. The mean hospital stay was 19.1 days; the longest hospitalization was 32 days and the shortest hospitalization was 9 days. Only 30% of the patients have chronic disease two (20%) patients had history of hypertension (HT), one (10%) patient had chronic obstructive pulmonary disease (COPD).

**Conclusion:** The management of the critically ill patients with well coordination of intensive care units and palliative care centers is a critical step to improve the quality of life scores for patients were on I-HMV.

**Keywords:** Invasive ventilation, non-invasive ventilation, palliative care

## INTRODUCTION

The mostly encountered patients who needs invasive home-type mechanical ventilation (I-HMV) are the ones suffering from neuromuscular diseases, congestive heart failure patients, diseases causing respiratory center pathologies, and chronic obstructive pulmonary diseases (COPD) (1,2). Home-based ventilator treatments are accepted as a good alternatives to long-term intensive care admissions for those cases after the acute treatment of the present problem (3).

There is a intersection point between palliative care, hospital care and home health care.

Palliative care units are the services where the patients had the medical care for chronic illnesses and when they become ready to discharged from hospital. Training of the family members who are in charge for home care of the patients were also done in the palliative services

before discharge. After education, the family members obtain self-confidence for management of appropriate home care of patients using I-HMV.

After education, even the treatment of the most complicated cases like those with tracheostomy (I-HMV) (4) can be done properly at home (4).

It is a big stress for patients' family members to take the responsibility of the home care of the critically ill patients. If the patients do not get the mechanical ventilator support even for few minutes, patients might have severe morbidity or even mortality.

In this study, we aimed to share information about the cases who were transferred to the palliative care center from our anesthesiology intensive care unit with i-HMV and discharged after education and treatment within one year in our clinic.

## MATERIAL AND METHOD

The study was carried out with the permission of Ethics Committee of Van Education and Research Hospital (Permission granted: 23/02/2017, Decision no: 2017/2). All procedures were performed adhered to the ethical rules and the Helsinki Declaration of Principles.

This retrospective, cohort study was conducted at Van Education and Research Hospital palliative care unit between January 2016 and February 2017. The anesthesiologist was the responsible physician of the palliative care center during this time period. The age, sex, primary diagnosis and comorbidity of the patients were analyzed using statistical methods.

## RESULTS

Four patients (40%) were female and other 6 (60%) were male, the mean age of the patients was  $47.9 \pm 16.39$ . It was found that 4 (40%) of the patients who used I-HMV had ALS, it was the most commonly encountered indication for I-HMV. The mean duration of stay in our palliative care unit was  $19.1 \pm 7.22$  days. The mean hospital stay was 19.1 days, the longest hospitalization period was 32 days and the shortest hospitalization period was 9 days. Only 30% of the patients have chronic systemic diseases. Two (20%) patients had history of hypertension (HT) and one (10%) patients had chronic obstructive pulmonary disease (COPD).

In our hospital, the palliative care center were first opened in May 2015 but not actively used due to lack of properly educated staff. On July 2016, an anesthesiologist started to the hospital and he was in charge of the palliative clinic. After this time, admission to palliative care unit dramatically increased. During the study period, 300 patients were followed in our clinic and the majority of them were those suffering the malignant diseases. (The second and third most common indication for hospital admission was the loss of swallowing reflex due to history of previous cerebrovascular diseases (CVD) and the undernourished patients who were planned to undergo endoscopic or surgical percutaneous endoscopic gastrostomy (PEG) procedures.

As per our the study protocol, patients who required prolonged mechanical ventilator support in intensive care units were undergone routine tracheostomy procedure in the early period to decrease the complications of the prolonged hospital stay and discharged from hospital after educating the relatives for invasive home mechanical ventilator use during the study period. The biggest problem that we encountered in discharge process was the prejudice of family members that they can never use the device properly (home mechanical ventilator, home type

aspirator etc.). The fear and insecurity of the patients' family members were usually resolved during the education done in the palliative care center during the hospitalization period. Education about the aspiration procedure, tracheostomy care, adequate nutrition support and what to do in case of emergency were given in the clinic to the family members who were the candidate for the home care of the patient. These family members were also playing on the active role in patient care in palliative care services and gained adequate knowledge and confidence to give this care at home within short period of time.

**Tablo.** Demographic and clinical characteristics of patients that ere using I-HMV

Patient No.	Age	Gender	Primary Diagnosis	Comorbidity
1	70	Female	Esophageal cancer	Hypertension
2	68	Female	Post-CPR sequelae	Tracheostomy stenosis
3	52	Male	ALS	
4	65	Female	ALS	Hypertension
5	67	Female	Post-CPR sequelae	COPD
6	27	Male	TBI	-
7	50	Male	ALS	-
8	50	Male	ALS	-
9	36	Male	TBI	-
10	24	Male	TBI	-

ALS: Amyotrophic lateral sclerosis; CPR: Cardiopulmonary resuscitation; TBI: Traumatic brain injury; COPD: Chronic obstructive pulmonary disease

## DISCUSSION

The I-HMV is a promising method, an a good alternative long term Intensive care admissions for MV and the use of the I-HMV are dramatically increased in all over the world in recent years. However, in our country, it is not so commonly used in hospitals probably due to lack of staff or financial issues and we have still long way to go. The widespread use of the I-HMV is a necessity to improve the life quality of the patients by allowing them to see their family members and friends and decrease the financial cost of the long-term hospital admissions.

At this point, as a palliative care clinic team, we aimed to show that we can work effectively to encourage relatives to actively assist patients care in the hospital and educate them about the necessary treatments that should continue at home and warning signs to call the hospital and do first aid in case of the any emergency at home.

In a study of Wallis et al. (5), the number of patients using HMV in the United Kingdom in 1990 was reported to be 35, it has been stated that this number has increased gradually over the years, reaching 241 in 2000 and 933 in 2008. In a study conducted in the United States (US), the prevalence of HMV application was calculated to be 6/100,000 and when this ratio was adapted to all countries, HMV was used in 4100 children in 2007 (6).

In recent years, more ergonomic and practical ventilators are offered for home use, and patients can be treated comfortably with these devices when first properly adjusted by the physician or trained health staff.

With the more common use of the those home ventilators, patients with chronic respiratory failure can be speculated to have reduced long-term hospital admissions in the intensive care units and by this way decreased morbidity and mortality rates and reduced treatment costs (7,8).

Patients who are clinically stable but have history of chronic respiratory failure are candidates for HMV because of the high cost of treatment in the hospitals and over-occupation of qualified hospital beds in intensive care units. Especially, patients with underlying neurological disease or chronic pulmonary disease have long hospital stay seems to be the good candidates for HMV. In a Canadian study, the HMV was used about 65% of the patients with neurological diseases and 32% of patients with chronic lung disease (9).

In our study, 70% of the cases have neurological disorders and 30% used HMV because of respiratory system failures and it were consistent with the literature data.

HMV applications can be performed as non invasive mechanical ventilation (NI-HMV) or invasive mechanical ventilation (I-HMV). Because of the progressive muscle weakness and neurological diseases of our patients, our preference was I-HMV. In this way, patient incompatibility and co-operative condition with the machine have been removed. There may be different practices in different countries and clinics. In the study conducted in England, NI-HMV was preferred in patients with underlying neurological disease, where as in a study conducted in Italy, it was stated that I-HMV was applied (10).

In a multi center study involving 16 European countries, the prevalence of HMV use was calculated as 6.6/100,000. In our country, there is no prevalence study done in this subject. However, we believe that many patients in the ICU who meet the appropriate conditions for HMV are not adequately guided for HMV use. We think that this ratio will increase by time due to the opening of new palliative care services or the improvement of the old one in future years.

However, the good cooperation between the ICU staff and with home care services is crucial. Therefore, it should not be forgotten that by using more home ventilation devices, the availability of intensive care beds will increase and less patient will suffer from late admission to ICU units.

It is also very important to provide adequate care support to the critically ill patient. A familymember of a patient

who had to stay in a long-term hospital due to the inability to find a nursein Edward et al. (11) study left the job and had economical problems and took care of their children by themselves. Gowans et al. (6) have been stated that nursing care can be given to 36 of 44 patients followed by HMV at certain hours of the day.

We believe that, it is very difficult to provide continuous nursing care at home in our country, due to cultural and economical problems. At this point, by providing adequate education on patient care in the palliative care units encourages relatives to take care of their patients at home.

## CONCLUSION

In our country, where it is difficult to find enough free qualified intensive care beds, that early use of HMV for the patients with chronic respiratory failure and serious neurological disease can improve the other critically ill patients survival rate and provide more efficient use of ICU beds. With the increase in the number of palliative care centers and proper use of HMV in appropriate cases, psychological and physical well being of the both patients and their families might also be improved.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study was carried out with the permission of Ethics Committee of Van Education and Research Hospital (Permission granted: 23/02/2017, Decision no: 2017/2).

**Informed Consent:** Because the study was designed retrospectively, no written informed consent form was obtained from patients.

**Referee Evaluation Process:** Externally peer-reviewed.

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## REFERENCES

1. Goldstein RS, Psek JA, GortEH. Home mechanical ventilation. Demographic sand user perspectives. Chest 1995; 108: 1581-6.
2. Eroğlu A, Ulusoy H, Erciyes N. Mechanical venlation at home. O.M.U. Med J 2003; 20: 28-31.
3. Scrivan S, Doty SM, White TR. Frequency causes, and outcome of home ventilatorfailure. Chest 1998; 114: 1363-7.

4. Muir JF, Cuvelier A. Evaluation of candidates for long-term ventilation. *Respir Care Clin North Am* 2002; 8: 405-18.
5. Wallis C, Paton JY, Beaton S, Jardine E. Children on long-term ventilatory support: 10years of progress. *Arch Dis Child* 2011; 96: 998-1002.
6. Gowans M, Keenan HT, Bratton SL. The population prevalence of children receiving invasive home ventilation in Utah. *Pediatr Pulmonol* 2007; 42: 231-6.
7. Hein H, Schucher B, Magnussen H. Quality of life of various patient groups during home mechanical ventilation. *Med Clin* 1999; 94: 99-101.
8. Karakurt Z. Home mechanical ventilation. *Yoğun Bakım Derg* 2004; 4: 145-50.
9. Amin R, Sayal P, Syed F, Chaves A, Moraes TJ, MacLusky I. Pediatric long-term home mechanical ventilation: twenty years of follow-up from one Canadian center. *Pediatr Pulmonol* 2014; 49: 816-24.
10. Simonds AK. Respiratory support for the severely handicapped child with neuromuscular disease: ethics and practicality. *Semin Respir Crit Care Med* 2007; 28: 342-54.
11. Edwards EA, O'Toole M, Wallis C. Sending children home on tracheostomy dependent ventilation: pitfall sand outcomes. *Arch Dis Child* 2004; 89: 251-5.