

# A phase II study of High-Flow Nasal Cannula as palliative care in advanced cancer patients.

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## Background

- Although about half of the patients with advanced cancer in palliative condition present with dyspnea due to various reasons, limited resolution exists.
- Opioids and/or sedation are generally administered, however, their detrimental side effects (i.e. sleepiness or inability in conversation) sometimes disturbed their quality of life.
- Regarding oxygen therapy, a few clinical trials showed efficacy and tolerability of HFNC (High-Flow Nasal Cannula) for dyspnea for limited duration (up to 2 hours).
- The aim of this prospective trial was to assess the efficacy and tolerability of HFNC for dyspnea for longer duration in patients with palliative setting.

## Methods

### Study design

#### Key inclusion criteria

- Patients with advanced cancer
- With dyspnea at rest (numeric rating scale score  $\geq 3$ )
- With respiratory failure
- ECOG PS of 3-4

HFNC for 5 days

(start with 40 L/min, to maintain SpO<sub>2</sub>: 90% or baseline)

- Primary endpoint:
  - Change of mean modified Borg scale at 24 hours
- Secondary endpoints:
  - Changes of mean modified Borg scale for 5 days
  - Mean comforts by NRS
  - Vital signs (respiratory rate, SpO<sub>2</sub>, Glasgow Coma Scale, etc)
  - Retention rate of HFNC and opioid use.
- Statistical consideration: Change of HFNC will improve modified Borg scale at 24 hours from 1.5 to 2.5 ( $\alpha = 0.10$  (one-sided) and  $\beta = 0.20$ ): 21 patients are required.
- This study was registered at UMIN (ID: 000035738).

## Results

Fig 1. CONSORT diagram

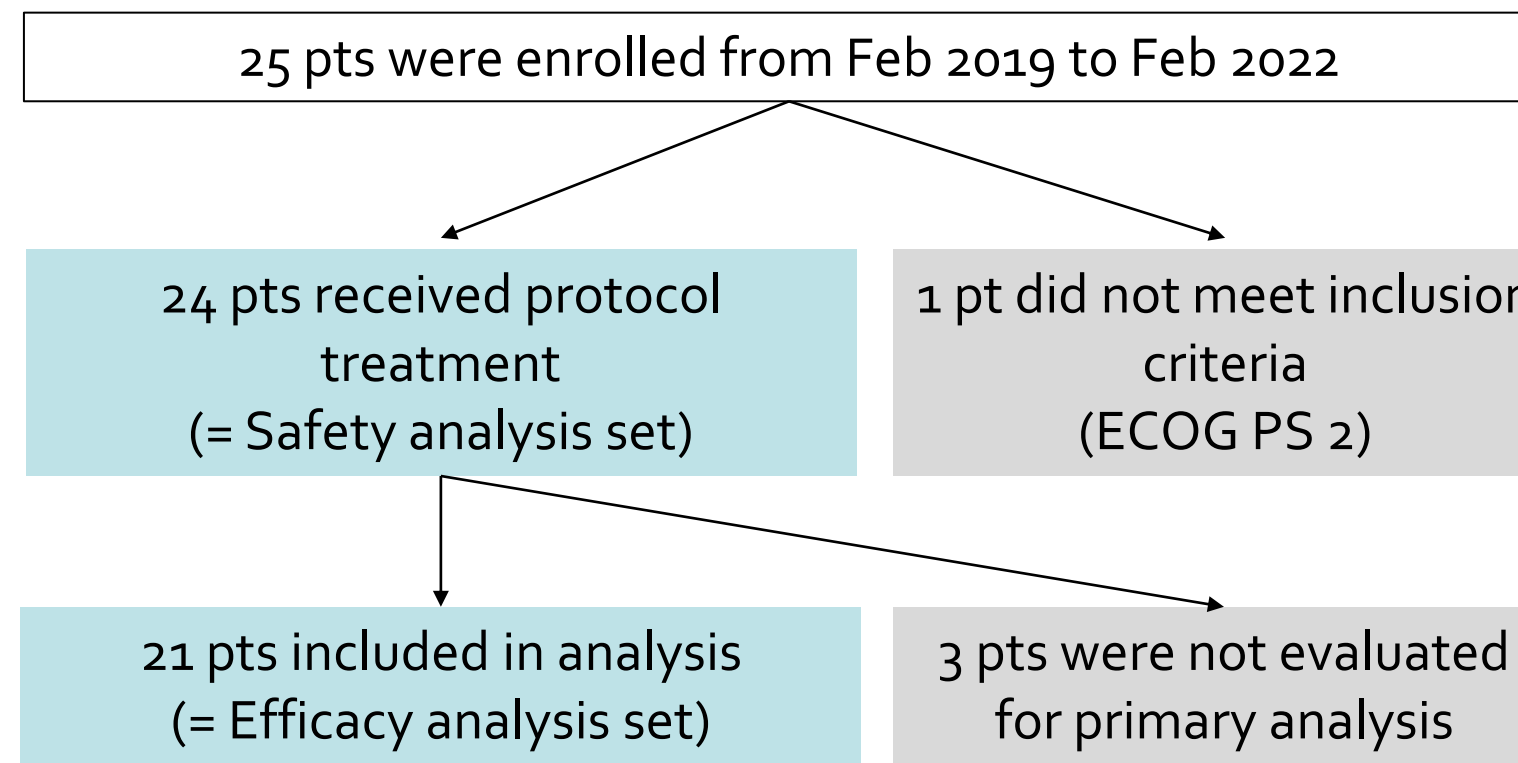
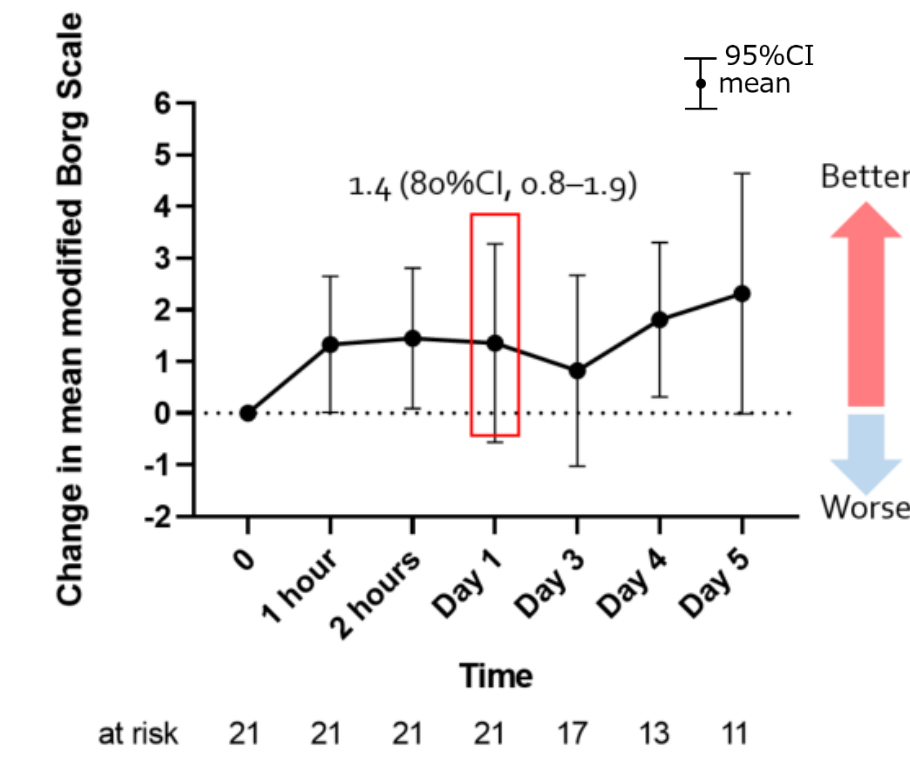


Table 1. Characteristics of patients (efficacy analysis set)

Characteristics	N = 21
Age, mean (range)	72 (48-92)
Male / Female	17 / 4
Former smoker / Never smoker	18 / 3
ECOG PS: 3 / 4	17 / 4
Lung cancer / Malignant pleural mesothelioma	20 / 1
Opioid use for dyspnea relief at enrollment: Yes / no	7 / 14
Intravenous morphine-equivalent dose mean (range), mg / day	21.2 (5-70)
Type of oxygen therapy: Cannula / Mask / Room air	13 / 7 / 1
Fraction of inspired oxygen, mean (range)	0.34 (0.21-1.0)
Respiratory rate, mean (range) per min	19 (12-25)
NRS (dyspnea) / modified Borg scale at enrollment, mean (range)	5.9 (3-10) / 5.2 (2-10)

Fig 2. Change of mean modified Borg scale



- Change of mean modified Borg scale at 24 hrs was 1.4 (80%CI, 0.8-1.9).
- Among 21 patients, 11 (52%) showed clinically meaningful improvement (\*).  
\* We defined as improvement of modified Borg scale  $\geq 1.5$  points (prespecified threshold in our study).
- Almost 40% of patients responded very early: nine (43%) responded at 1 hr and 10 (48%) responded at 2 hrs. Importantly, these early responders maintained improvement for 24 hours.

Fig 3. Early responders vs non-responders

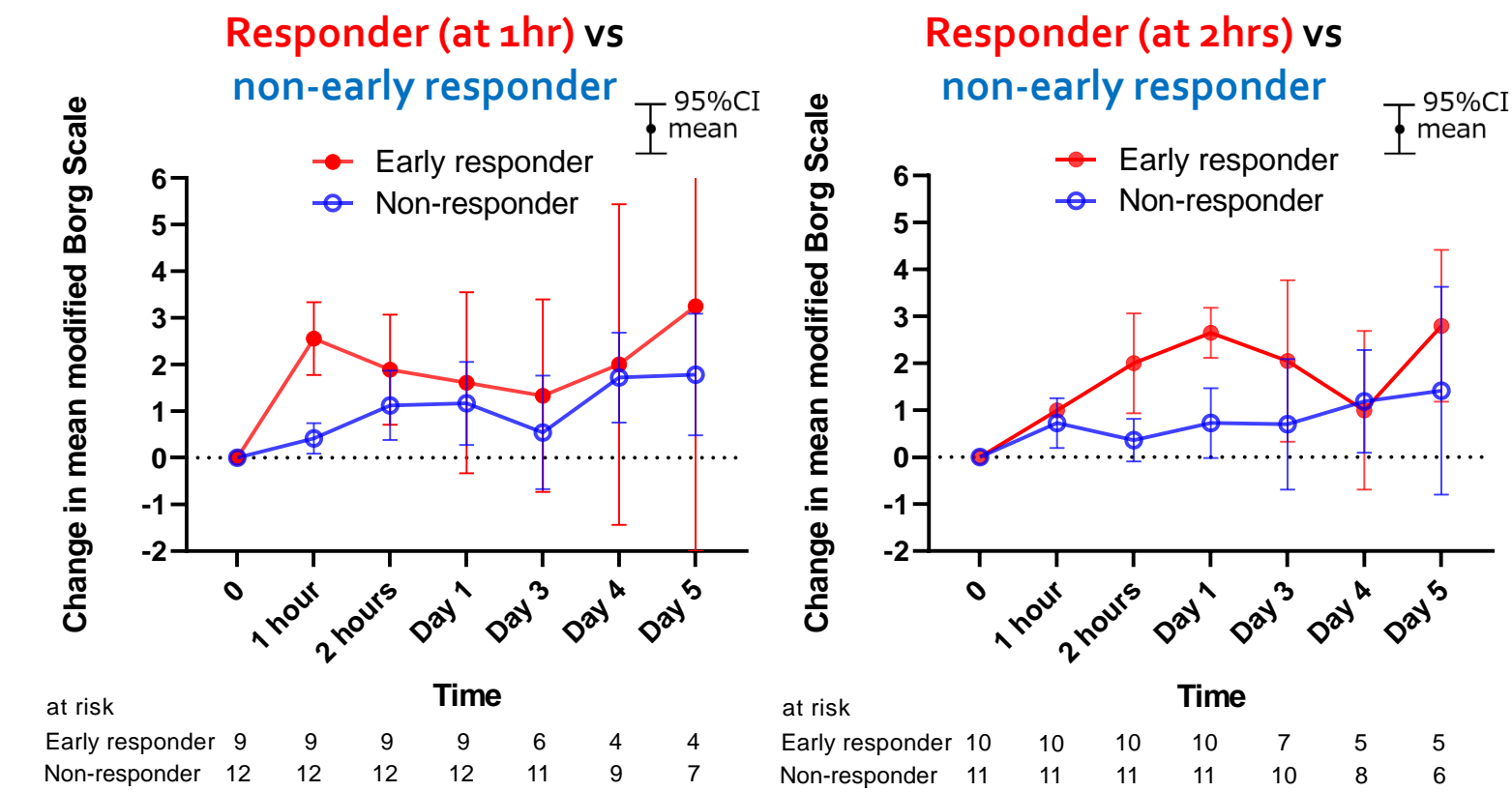


Fig 4. Kaplan-Meier curve of overall survival

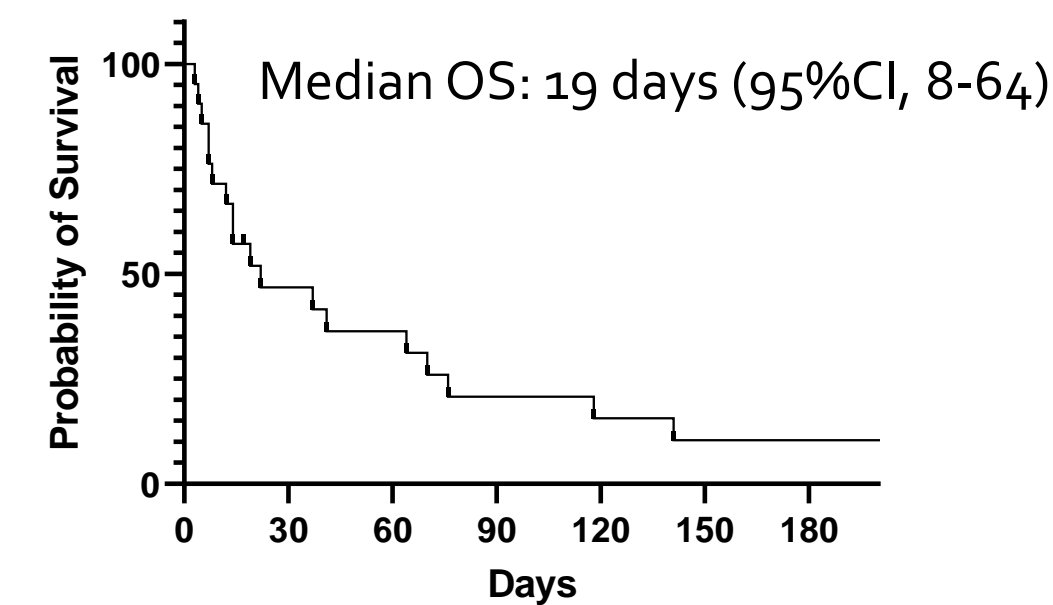
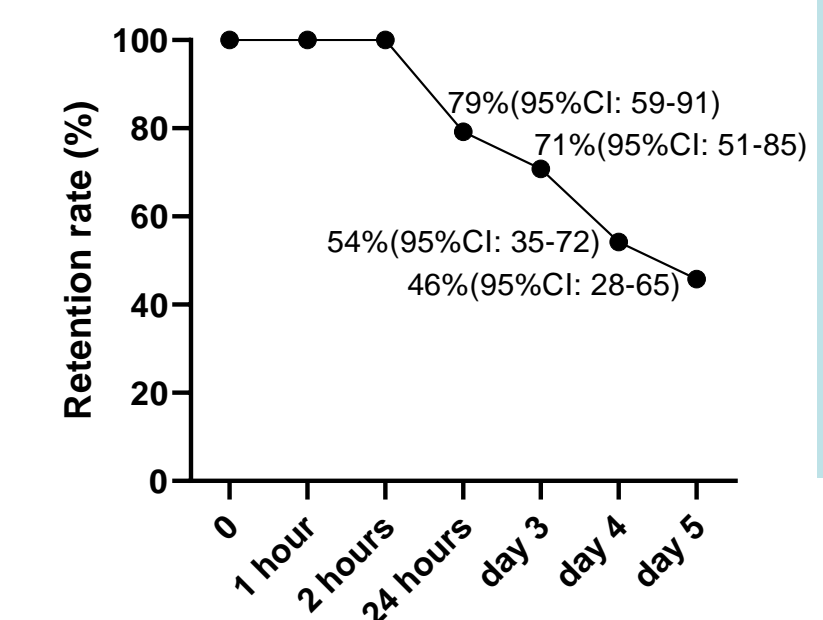


Fig 5. Retention rate of HFNC



- 19 pts (79%) could continue HFNC for 24 hours and 11 pts (46%) completed 5 days.
- Reasons for withdrawn: 12 pts by discomfort and 1 pt by delirium.

## Conclusion

- Although our study did not accomplish prespecified threshold, it should be noted that almost half showed clinically meaningful improvement in dyspnea.
- Early change of modified Borg scale (at 1 or 2 hours) may predict the durable benefit of HFNC.
- HFNC can be a palliative treatment option in advanced cancer patients with dyspnea, and we are planning a Phase III trial.

#### Key inclusion criteria

- Patients with advanced cancer
- ECOG PS of 3-4
- With worsening dyspnea at rest in 2 weeks (mBorg scale  $\geq 3$ )
- With respiratory failure

