

# Transcutaneous PCO<sub>2</sub> (TcPCO<sub>2</sub>) in COPD patients during incremental exercise test (IET).

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## BACKGROUND

Respiratory pump failure in COPD patients can lead to CO<sub>2</sub> retention during exercise, but little is known about the factors determining CO<sub>2</sub>-levels during exercise in COPD patients.

## AIM

To investigate the pattern of TcPCO<sub>2</sub> in COPD patients during exercise and factors driving this CO<sub>2</sub> response.

## METHODS

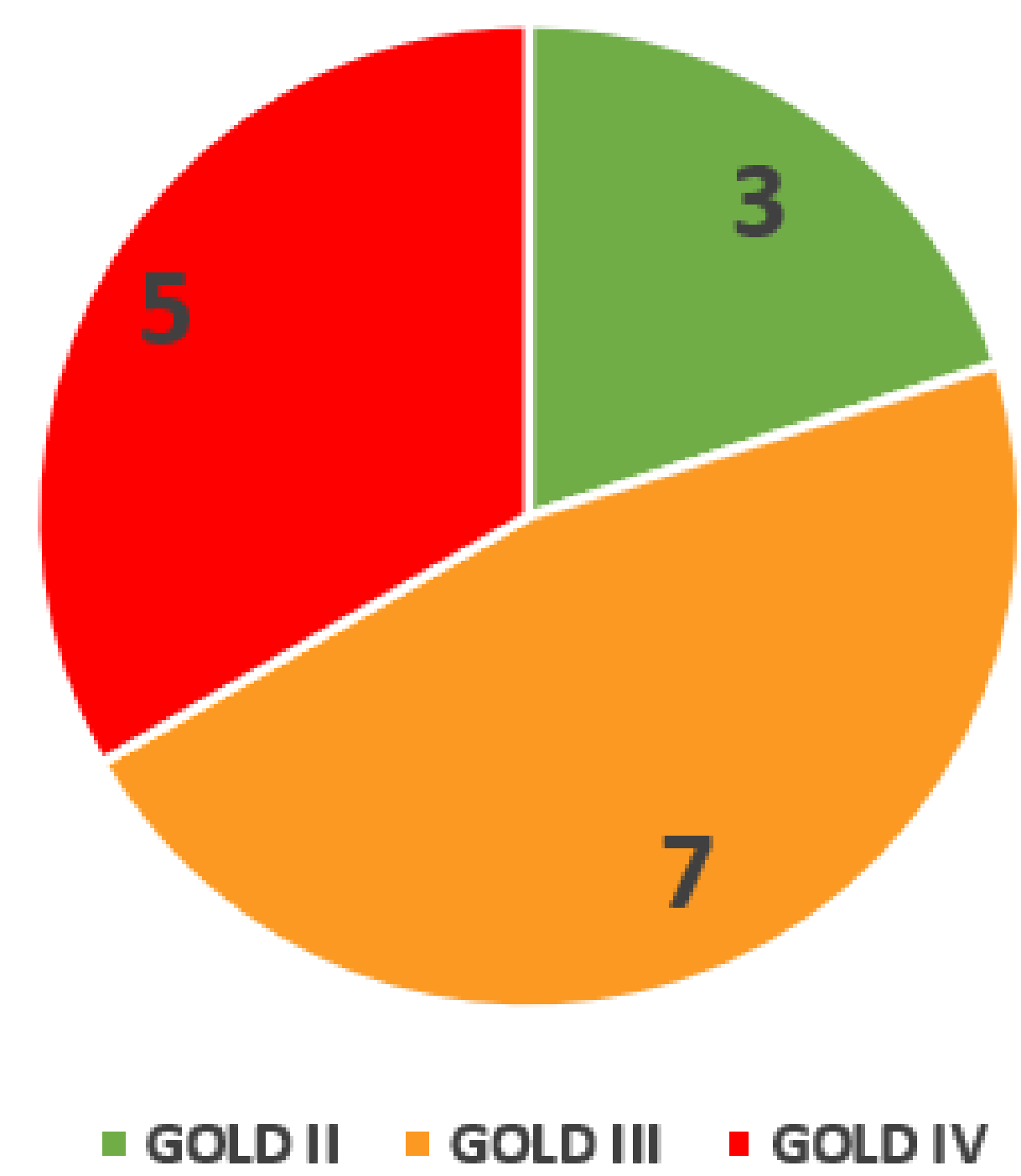
15 COPD patients (age 65(8)y, FEV1 38(15)%pred, TcPCO<sub>2</sub> at rest 39(4) mmHg, oxygen users 6/15) performed:

- Lung function
- Incremental exercise test (IET)
- During IET, TcPCO<sub>2</sub> was measured continuously
- In O<sub>2</sub> users the IET was performed under O<sub>2</sub> breathing

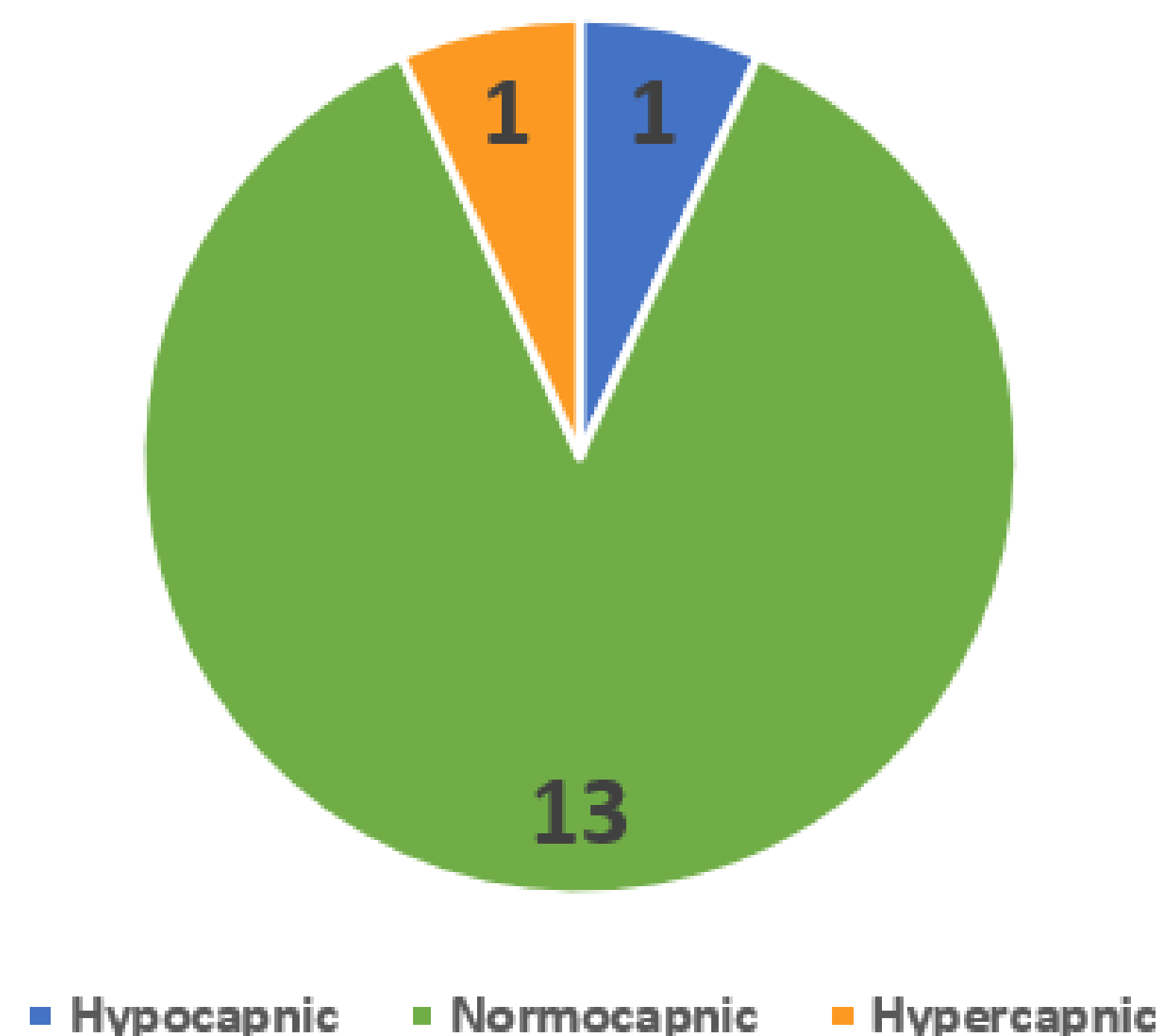


## RESULTS

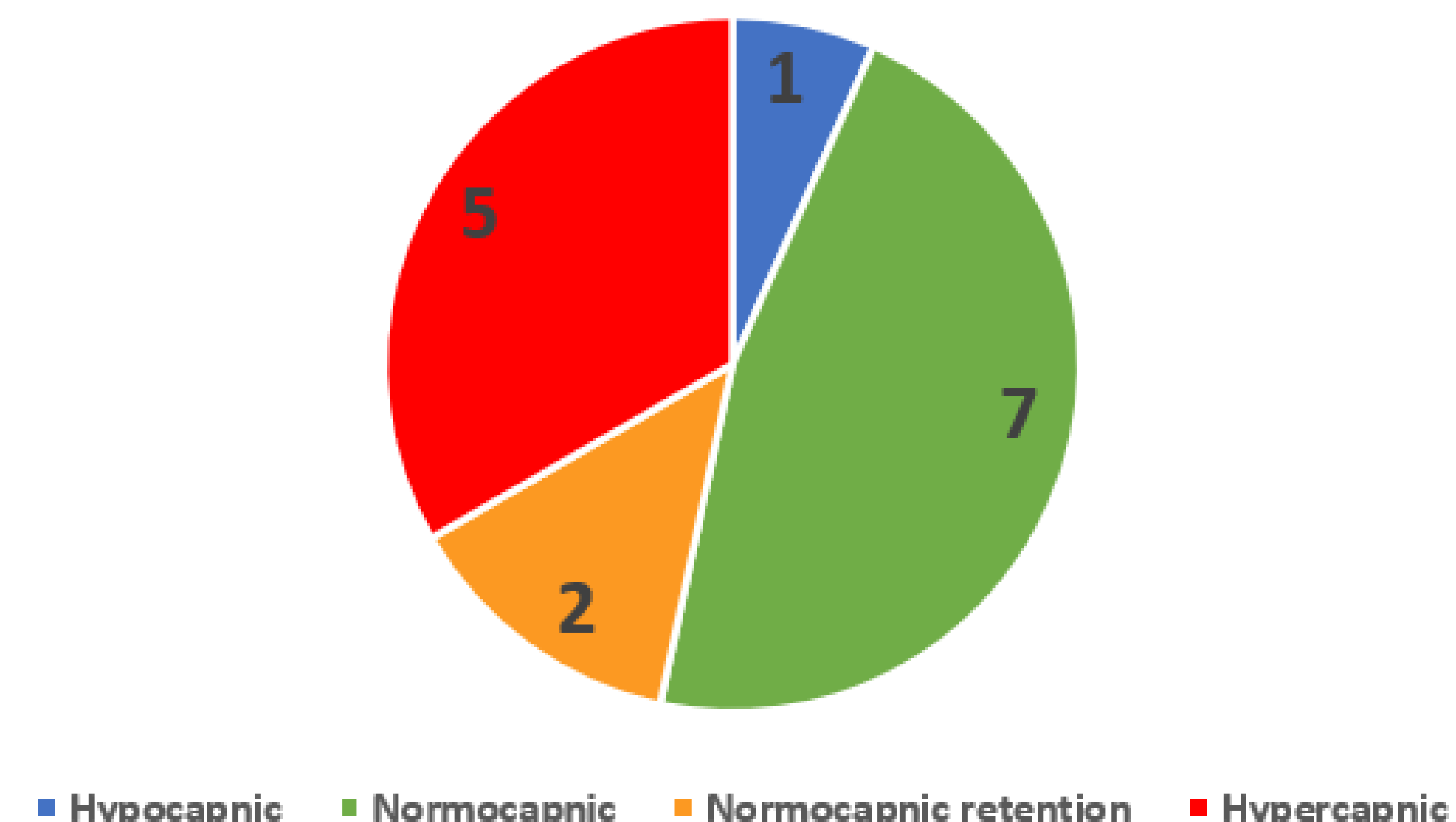
GOLD status



Baseline TcPCO<sub>2</sub>



TcPCO<sub>2</sub> during exercise



- In 6 patients, CO<sub>2</sub> retention was observed, 4 of them became hypercapnic
- Both maximal minute volume (MMV) and baseline TcPCO<sub>2</sub> correlated significantly with maximal TcPCO<sub>2</sub> ( $r=-0,63$ ;  $p=0,012$  and  $r=0,79$ ;  $p<0,001$ )
- $\Delta$ TcPCO<sub>2</sub> correlated significantly with MMV ( $r=-0,68$ ;  $p=0,006$ ) but did not correlate with baseline TcPCO<sub>2</sub> ( $r=0,35$ ;  $p=0,201$ )
- no significant differences in maximal TcPCO<sub>2</sub> ( $p=0,239$ ) or  $\Delta$ TcPCO<sub>2</sub> ( $p=0,409$ ) were found between patients with or without oxygen use

*Normocapnic: TcPCO<sub>2</sub> 35-45 mmHg*

*Hypocapnic: TcPCO<sub>2</sub> <35 mmHg*

*Hypercapnic: TcPCO<sub>2</sub> >45 mmHg*

*Normocapnic retention: TcPCO<sub>2</sub> 35-45 mmHg and  $\Delta$ TcPCO<sub>2</sub> > 4 mmHg*

*The numbers in the pie diagrams reflect the amount of patients in that group*

## CONCLUSION

- The CO<sub>2</sub>-response of COPD-patients during IET is heterogeneous with 4/15 developing hypercapnia
- In this study, MMV was the most important factor correlating with CO<sub>2</sub> retention during exercise
- $\Delta$ TcPCO<sub>2</sub> was not associated with baseline TcPCO<sub>2</sub>
- O<sub>2</sub> dependent patients do not show significant differences in maximal TcPCO<sub>2</sub> or a stronger increase in CO<sub>2</sub> when compared to patients without O<sub>2</sub>