

# ASSOCIATION BETWEEN CPET PARAMETERS AND SURGICAL DECISION MAKING IN A CONTEMPORARY COHORT

Pierce Marsden<sup>1</sup>, Kristin Southwell<sup>1</sup>, Nicholas Romeo<sup>1</sup>, Maitri Munsif<sup>1,2</sup>, Liam M Hannan<sup>1,2</sup>, Kanishka Rangamuwa<sup>1</sup>

<sup>1</sup>Department of Respiratory Medicine, Northern Health, Epping, Victoria. <sup>2</sup>University of Melbourne, Parkville, Victoria, Australia.

## Introduction/Aim

Cardiopulmonary Exercise Testing (CPET) is a validated method for preoperative risk stratification using  $\text{VO}_2$  peak,  $\text{VO}_2$  at anaerobic threshold ( $\text{VO}_2\text{@AT}$ ), and ventilatory efficiency ( $\text{VE}/\text{VCO}_2$  slope). However, its influence on real-world surgical decision-making remains unclear. This study assessed the impact of CPET metrics on surgical decisions and outcomes.

## Method

Retrospective analysis of preoperative CPET referrals from 2023 to 2025 at Northern Health. Demographic, physiological, and surgical outcome data were analysed using GraphPad Prism v10.6.1.

## Results

During the observation period  $n=30$  studies referred for preoperative assessment were included in the analysis. Mean age  $70.1\pm10.9$  (years, SD), predicted  $\text{FEV}_1$   $80.5\pm21.6$  (%), ECOG  $0.5\pm0.6$  (SD,  $n=27$ ), mean reported comorbidities  $2.5\pm1.5$  (SD).

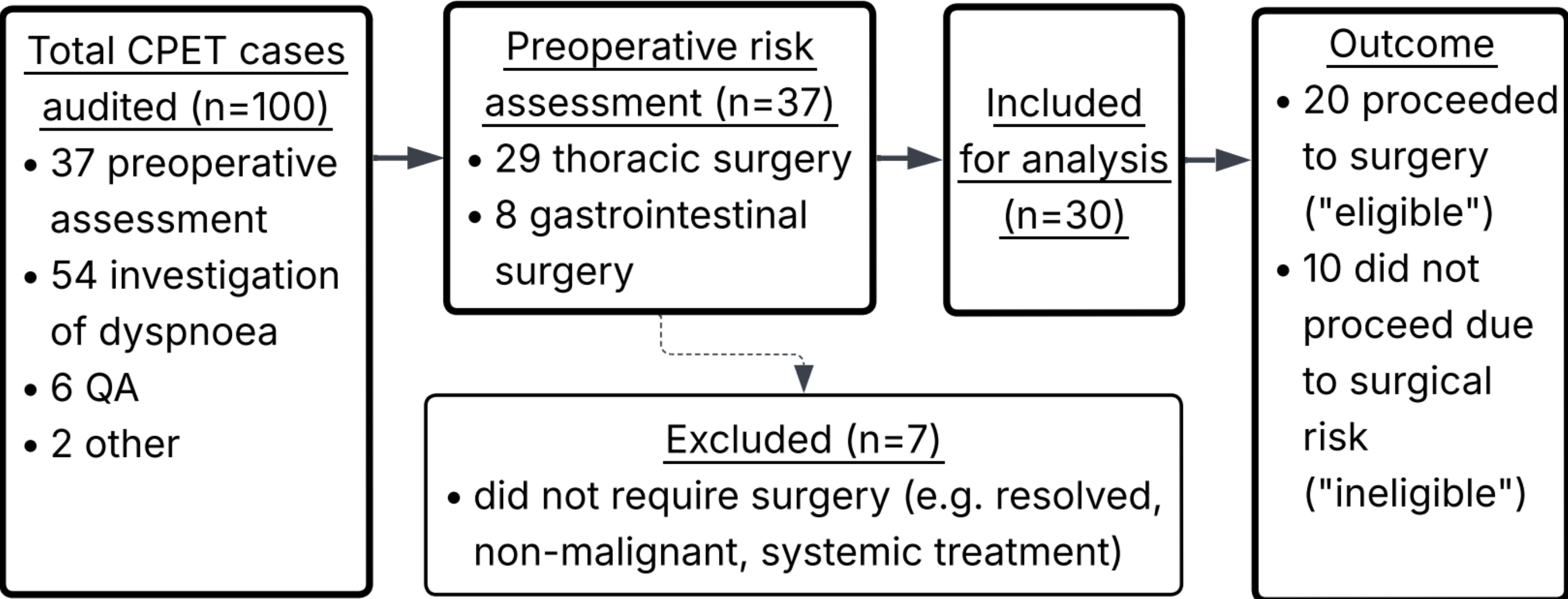


FIGURE 1: Audit inclusion process and subsequent surgical decisions.

After CPET,  $n=20$  proceeded to surgery ("eligible") and  $n=10$  were declined surgery due to high perioperative risk ("ineligible"). Of those considered ineligible, CPET results were specifically cited in documentation as reason.

Baseline characteristics did not significantly differ between groups ( $P>0.05$ ). No significant association was observed between individual CPET metrics and surgical decision-making ( $p>0.05$ ). Among those who underwent surgery, there was no 90-day mortality, although  $n=2$  had ICU stays  $>24$  hours.

| TABLE 1: Mean CPET risk stratification metric in those who proceeded to surgery ("eligible") and those declined surgery due to high perioperative risk ("ineligible") |                            |                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|
| Parameter                                                                                                                                                             | Eligible                   | Ineligible                 |
| Mean $\text{VO}_2$ peak (ml/kg/min)                                                                                                                                   | $15.5\pm3.8$ (SD, $n=20$ ) | $13.3\pm2.8$ (SD, $n=10$ ) |
| Mean $\text{VO}_2\text{@AT}$ (ml/kg/min)                                                                                                                              | $11.9\pm2.8$ (SD, $n=19$ ) | $10.5\pm1.8$ (SD, $n=8$ )  |
| Mean $\text{VE}/\text{VCO}_2$ slope                                                                                                                                   | $36.4\pm5.8$ (SD, $n=20$ ) | $42.6\pm7.9$ (SD, $n=10$ ) |

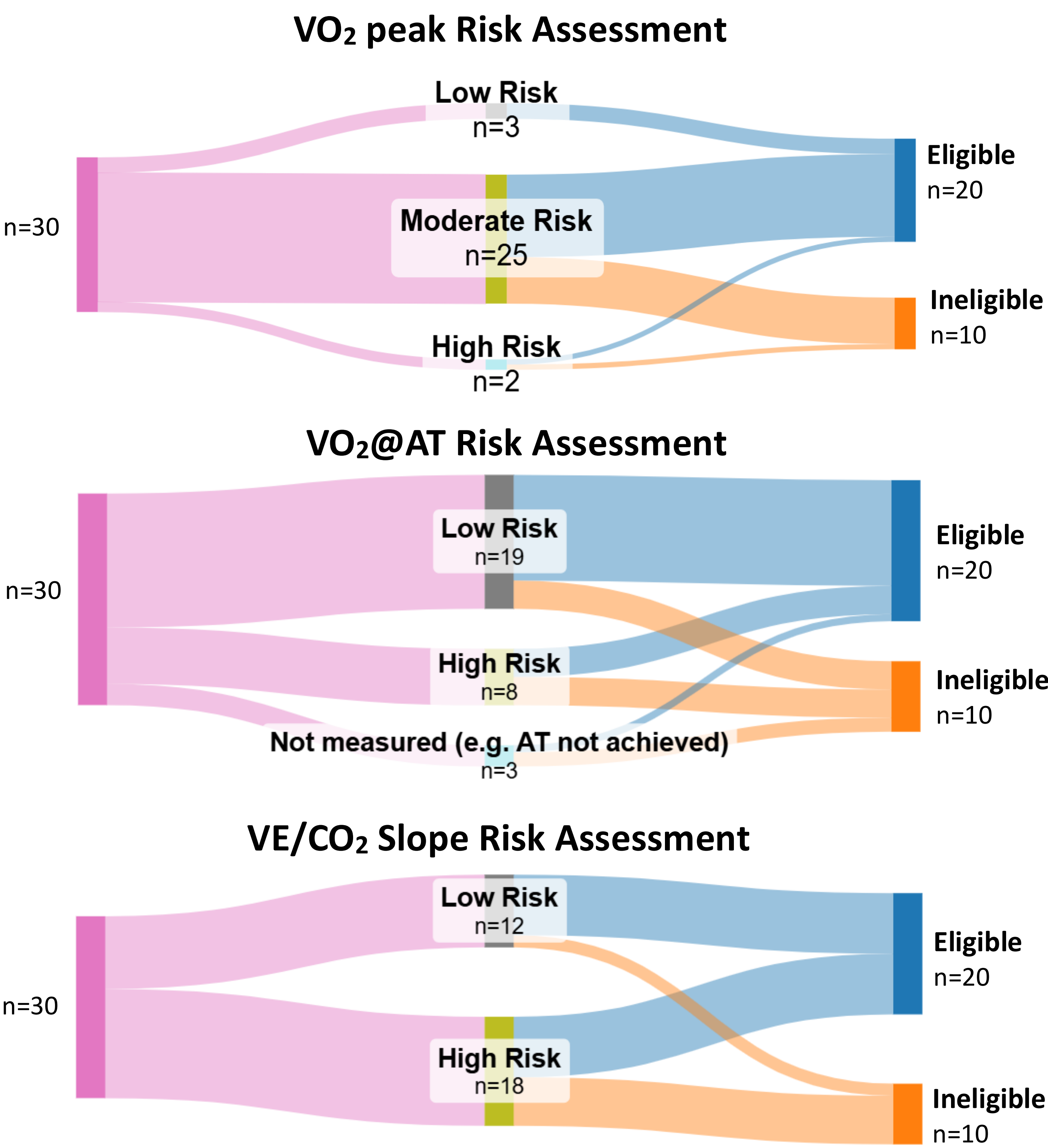


FIGURE 2: Sankey plots of risk assessment based on CPET metrics with subsequent surgical decision. Risk classifications:  $\text{VO}_2$  peak: low risk  $>20\text{ml/kg/min}$ , moderate risk  $10\text{--}20\text{ml/kg/min}$ , high risk  $>20\text{ml/kg/min}$ .  $\text{VO}_2\text{@AT}$ : low risk  $\geq11\text{ml/kg/min}$ , high risk  $<11\text{ml/kg/min}$ .  $\text{VE}/\text{CO}_2$  Slope: low risk  $<35$ , high risk  $\geq35$ .

## Conclusion

- CPET results were often cited when patients were deemed by clinicians to be unfit for surgery.
- No single CPET metric reliably differentiated between those who were considered eligible for surgery and those considered unacceptably high-risk.
- Decisions may have integrated multiple CPET parameters alongside other clinical findings.
- Sample size may have limited statistical power.