

Is Cardiopulmonary Exercise Testing Predictive of Survival Outcomes in Patients Undergoing Surgery for Ovarian Cancer?

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INTRODUCTION

Ovarian cancer is the sixth most common cancer among women in the UK, with around 7,500 new cases annually. The disease primarily affects older women, peaking between ages 75 to 79, and is often diagnosed at advanced ages. These patients typically have poor performance status and high symptom burden, contributing to poor outcomes.

Due to extensive disease burden, many patients have compromised nutritional status and physical fitness, placing them at high risk for surgery. Recent data found that 26.2% of women with ovarian cancer were not offered treatment due to poor fitness.

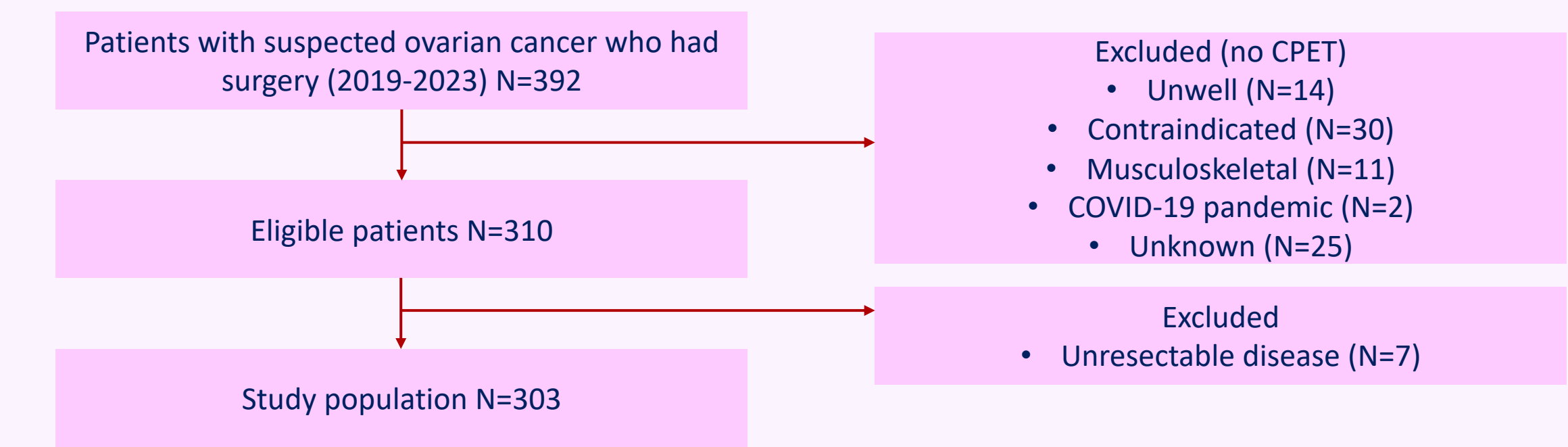
Over the last few years, Cardiopulmonary Exercise Testing (CPET) has gained traction in the evaluation of a patient’s fitness prior to surgery. CPET offers an objective measure of functional capacity by evaluating respiratory and cardiovascular responses to exercise. **This study aims to evaluate whether CPET parameters can predict overall and progression-free survival in women undergoing surgery for all stages of ovarian cancer.**

METHODS

- Study population** – Retrospective cohort study (2019-2023), at Northern Gynaecological Oncology Centre (NGOC), of patients who underwent CPET before surgery for suspected or confirmed ovarian cancer; exclusions were benign or borderline histological diagnoses or CPET contraindications.
- Data collection** – Medical records. This included patient demographics, baseline characteristics (ECOG performance status, ASA physical status), surgical details (type, timing, cytoreductive status) and CPET parameters (anaerobic threshold (AT), VO₂ peak, VE/VCO₂).
- Outcomes** – Overall survival and recurrence-free survival.
- Statistical analysis** – Kaplan-Meier and Cox regression was used to evaluate survival outcomes according to CPET parameters. These were adjusted for clinical covariates with significance at p<0.05.

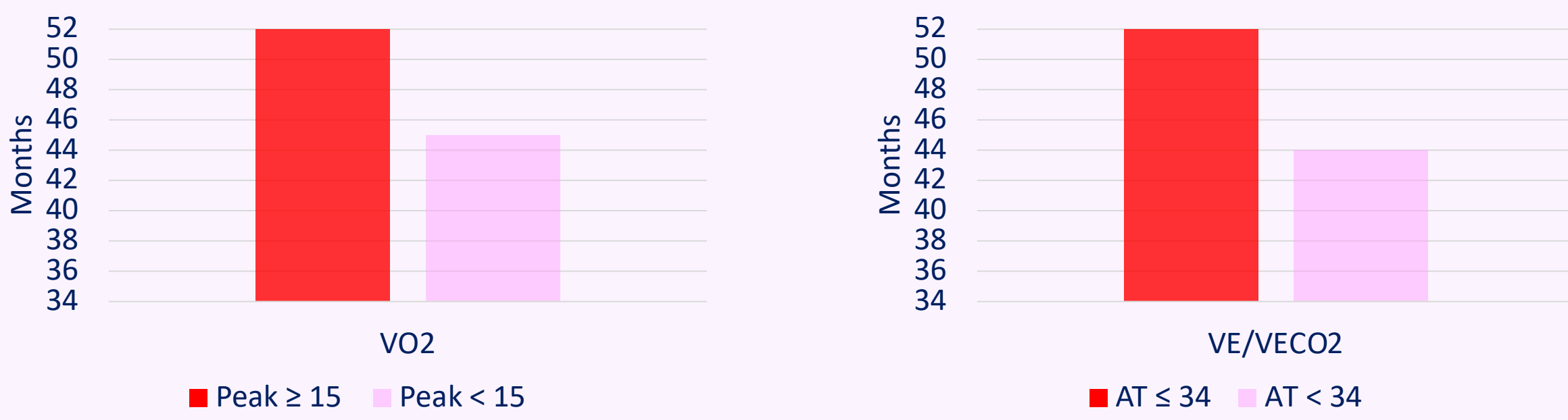
RESULTS

A total of 392 patients underwent surgery for ovarian cancer at NGOC between 2019 and 2023. Of these, 303 were included in our study population.



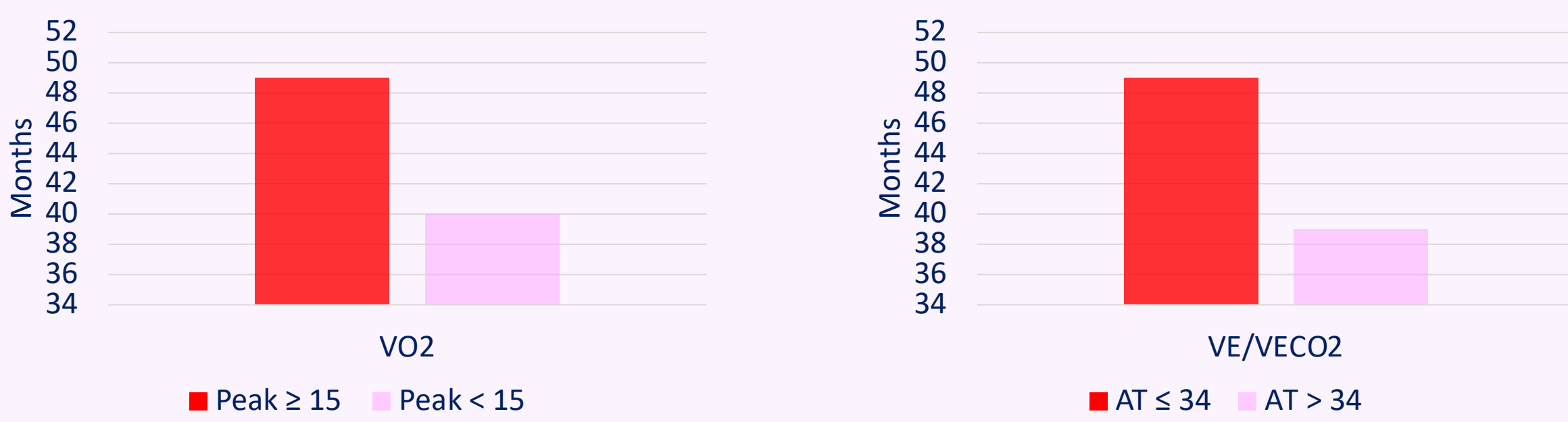
Overall Survival

The mean estimated survival of the study population was 50 months, with a 1-year survival of 92%. Analysis showed that low-risk CPET performance, including VO₂ peak ≥ 15 and VE/VO₂ at AT ≤ 34 were significantly associated with improved survival. After multivariate analysis, peak VO₂ remained statistically significant but VE/VCO₂ did not.



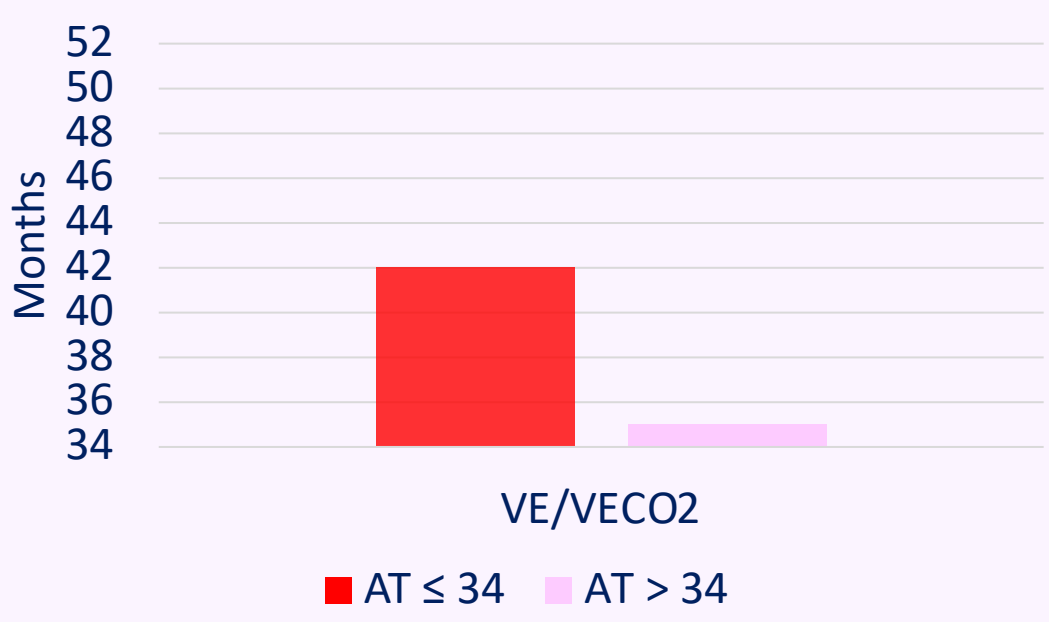
Subgroup Analysis

Sub analysis of advanced-stage ovarian disease (IIIB to IVB) showed that VO₂ peak ≥ 15 and VE/VO₂ at AT ≤ 34 were significantly associated with improved survival. Both retained statistical significance after multivariate analysis.



Recurrence-Free Survival

VE/VCO₂ was found to be associated with recurrence-free survival. However, it did not retain its statistical significance after multivariate analysis.



DISCUSSION

CPET is primarily considered an anaesthetic tool for preoperative risk stratification and perioperative anaesthetic planning. However, it is increasingly being recognised as an objective measure to aid post-operative risk stratification and possibly predict long-term outcomes. This study is the first to assess the association between objective cardiovascular fitness measured by CPET parameters and survival of ovarian cancer patients.

Strengths:

- Large patient cohort
- Correction for possible confounding factors
- Sub-analysis

Limitations:

- Retrospective design and heterogenous study cohort which included patients having surgery in primary and interval settings after neoadjuvant chemotherapy
- Inability to account for other confounding variables e.g., response to chemotherapy and genetic mutations

CONCLUSION

This study is the first to demonstrate the association between fitness, as measured by CPET parameters, peak VO₂ and VE/VO₂ at AT, and survival outcomes. In our study, VO₂ peak ≥ 15 was significantly associated with improved overall survival, and VE/VCO₂ at AT ≤ 34 was associated with improved survival in patients with advanced-stage disease.

AT may have a predictive value in a subset of patients, but this requires further research. More studies are needed to delineate the relationship between CPET parameters and long-term outcomes and to assess to what extent these effects are modifiable to improve survival and quality-of-life outcomes.

REFERENCES

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