

Introduction and aims

Enhanced Recovery After Surgery (ERAS) principles are now well established in most surgical cohorts, and early mobilisation is a key component of this multi modal intervention, but physical activity-based interventions after discharge from hospital are not widely studied.

In the neoadjuvant setting, improvements in physical activity levels (PAL) are associated with a higher likelihood of surgical resection, with lower risk of readmission (1).

Loss of muscle mass is associated with chemotherapy toxicity (2), and physical activity programmes have been suggested to support completion of adjuvant chemotherapy (3).

This subgroup analysis of a larger study aimed to quantify PAL and muscle mass after surgery to identify areas for further research.

Methodology

Pancreaticoduodenectomy (PD) patients wore wrist-based accelerometers for 28 days after surgery and completed physical activity questionnaires pre-operatively and at 1 month after surgery using the International Physical Activity Questionnaire (IPAQ) long form.

Ultrasound (US) measurements of the rectus femoris muscles were undertaken pre-operatively, at discharge and at one month after surgery (Figure 1).

This study was approved by the local ethics committee (21/LO/0139). Data analysis was carried out in SPSS (version 28, IBM, US).



Figure 1: Examples of ultrasound measurements taken of the rectus femoris muscle.

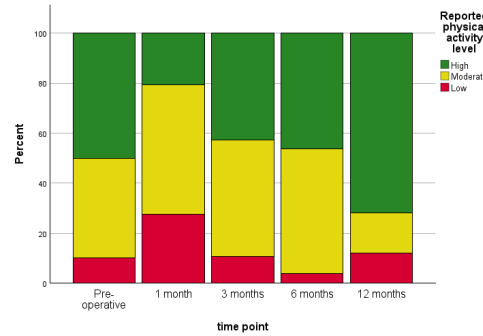


Figure 2: Reported activity questionnaire using the International Physical Activity Questionnaire in patients prior to and up to 12 months after pancreaticoduodenectomy.

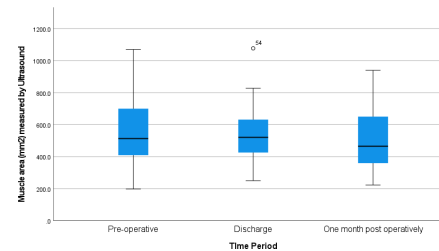


Figure 3: Changes in muscle area measured by ultrasound in patients undergoing pancreaticoduodenectomy (n=33) or CT (n=13).

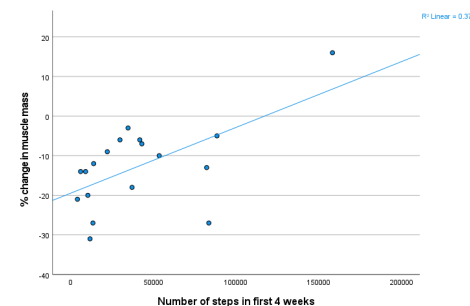


Figure 4: Scattergraph demonstrating increase muscle loss in those with lower step counts in the first 28 days following pancreaticoduodenectomy (n=26).

Results

Thirty-five patients (71% male, mean age 66 (SD 9.5) years) due to undergo PD in a tertiary centre were recruited to this observational study. Mean length of stay was 11 days (SD 7.7). PAL were highly varied with only 6 patients reaching 5,000 steps/day for ≥ 1 day and 3 patients reaching 10,000 steps/day for ≥ 1 day by day 28 post operatively.

Six patients self-reported high PAL 1 month after surgery (Figure 2), but their corresponding step counts (7 day mean) ranged from 1396 to 7781 steps/day (data not available for one patient).

Patient-reported PAL did not predict step count post operatively; step counts were not significantly different between low and medium PAL reporters ($p=0.088$), medium and high reporters ($p=0.258$) or between low and high reporters ($p=0.37$).

Individually 25 patients (76%) demonstrated a reduction in muscle mass between the pre-operative and 1 month US (Figure 3).

Muscle loss was greater in those who undertook less physical activity post-operatively, demonstrating a moderate correlation ($R^2=0.371$) (Figure 4)

Conclusion

- Physical activity after PD is not widely studied but may have a role to play in supporting patients to complete adjuvant chemotherapy.
- PALs were low and appeared to be over reported by patients.
- Further work should combine nutritional interventions and physical activity targets to support rehabilitation from PD.

Acknowledgements

This project was supported with a Pump Priming Grant from the Pancreatic Society of Great Britain and Ireland and a research grant from Pancreatic Cancer UK.

References:

1. Ngo-Huang et al, *Annals of surgery*. 2023;278(1):22-30.
2. Pin et al, *Curr Opin Support Palliat Care*. 2018;12(4):420-6.
3. Okada et al, *Journal of the American College of Surgeons*. 2022;235(6):848-58.