

Supplementary

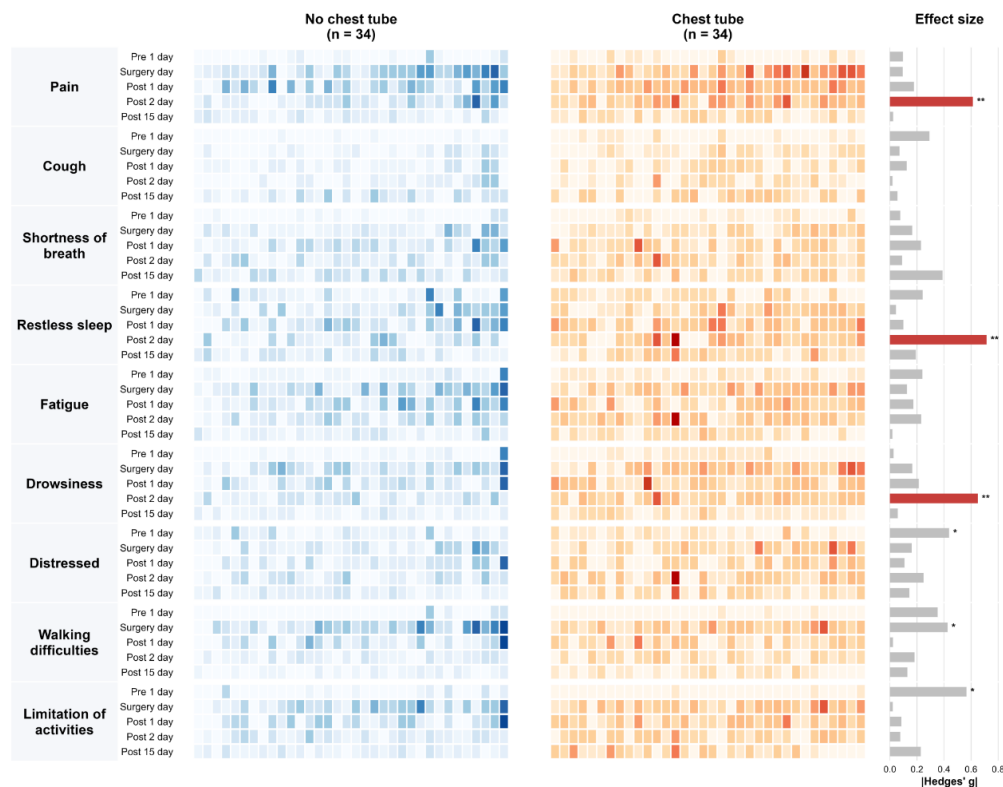


Figure S1 The heatmaps display patient level ePRO scores in the no chest tube group and chest tube group (n=34 per group) across five perioperative time points: preoperative day 1, day of surgery, postoperative day 1, postoperative day 2, and postoperative day 15. Symptoms included pain, cough, shortness of breath, restless sleep, fatigue, drowsiness, distress, difficulty walking, and activity limitation. Each tile represents an individual patient's symptom score on a 0 to 10 scale, with darker shading indicating greater symptom burden. The no chest tube group is shown in blue and the chest tube group in a warm color scale to facilitate visual comparison of within group symptom patterns. The right panel shows absolute Hedges' g values for between group differences at each symptom and time point comparison. Red bars indicate effect sizes >0.60, whereas gray bars indicate effect sizes ≤0.60; * denotes an effect size of 0.40 to 0.60 and ** denotes an effect size >0.60. The asterisks indicate effect size categories rather than statistical significance. Corresponding between group comparisons are reported separately in Table 3, in which significant differences were observed for pain, restless sleep, and drowsiness on postoperative day 2.

Table S1 Missing data by variable in the matched cohort before multiple imputation (N=68)

Variable	Missing, n	Missing, %
Baseline and perioperative variables		
Age	0	0
Sex	0	0
Body mass index	0	0
Tumor laterality	0	0
cT stage	0	0
Operative time	0	0
Anesthesia time	0	0
Intraoperative blood loss	0	0
Postoperative hospital stay	0	0
Wearable-derived variables		
Body temperature, Pre 1 day	6	8.8
Body temperature, Surgery day	6	8.8
Body temperature, Post 1 day	2	2.9
Body temperature, Post 2 day	21	30.9
Heart rate, Pre 1 day	6	8.8

Heart rate, Surgery day	6	8.8
Heart rate, Post 1 day	2	2.9
Heart rate, Post 2 day	21	30.9
Oxygen saturation, Pre 1 day	6	8.8
Oxygen saturation, Surgery day	6	8.8
Oxygen saturation, Post 1 day	2	2.9
Oxygen saturation, Post 2 day	21	30.9
Sleep quality score, Pre 1 day	6	8.8
Sleep quality score, Surgery day	0	0
Sleep quality score, Post 1 day	10	14.7
Step count, Surgery day	6	8.8
Step count, Post 1 day	5	7.4
Electronic patient-reported outcomes		
Pain, Pre 1 day	0	0
Pain, Surgery day	9	13.2
Pain, Post 1 day	12	17.6
Pain, Post 2 day	17	25
Pain, Post 15 day	10	14.7
Cough, Pre 1 day	0	0
Cough, Surgery day	9	13.2
Cough, Post 1 day	12	17.6
Cough, Post 2 day	17	25

Cough, Post 15 day	0	0
Shortness of breath, Pre 1 day	0	0
Shortness of breath, Surgery day	9	13.2
Shortness of breath, Post 1 day	12	17.6
Shortness of breath, Post 2 day	17	25
Shortness of breath, Post 15 day	10	14.7
Restless sleep, Pre 1 day	0	0
Restless sleep, Surgery day	9	13.2
Restless sleep, Post 1 day	12	17.6
Restless sleep, Post 2 day	17	25
Restless sleep, Post 15 day	10	14.7
Fatigue, Pre 1 day	0	0
Fatigue, Surgery day	9	13.2
Fatigue, Post 1 day	12	17.6
Fatigue, Post 2 day	17	25
Fatigue, Post 15 day	10	14.7
Drowsiness, Pre 1 day	0	0
Drowsiness, Surgery day	9	13.2
Drowsiness, Post 1 day	12	17.6
Drowsiness, Post 2 day	17	25
Drowsiness, Post 15 day	10	14.7
Distressed, Pre 1 day	0	0

Distressed, Surgery day	9	13.2
Distressed, Post 1 day	12	17.6
Distressed, Post 2 day	17	25
Distressed, Post 15 day	10	14.7
Difficulty walking, Pre 1 day	0	0
Difficulty walking, Surgery day	9	13.2
Difficulty walking, Post 1 day	12	17.6
Difficulty walking, Post 2 day	17	25
Difficulty walking, Post 15 day	10	14.7
Activity limitation, Pre 1 day	0	0
Activity limitation, Surgery day	9	13.2
Activity limitation, Post 1 day	12	17.6
Activity limitation, Post 2 day	17	25
Activity limitation, Post 15 day	10	14.7

Values are presented as the number and percentage of participants with missing data before multiple imputation. Most missing data occurred because some patients were discharged before later scheduled in-hospital assessments, particularly postoperative day 2, rather than because of data collection error or formal loss to follow-up.

Table S2 Complete-case sensitivity analysis of postoperative day 2 ePROs

Outcome	No-chest-tube group (n=20)	Chest-tube group (n=20)	Mean difference (95% CI)	P value
Pain	2.50 ± 2.12	4.20 ± 2.21	1.70 (0.11 to 3.29)	0.038
Restless sleep	1.95 ± 1.88	3.40 ± 2.50	1.45 (−0.17 to 3.07)	0.077
Drowsiness	1.80 ± 1.20	3.35 ± 1.73	1.55 (0.46 to 2.64)	0.008

Data are presented as mean ± standard deviation. The complete-case analysis was restricted to matched pairs in which both patients had observed postoperative day 2 data. Between-group differences were analyzed using the same matched-pair linear model as in the primary analysis, without multiple imputation. Mean differences were calculated as the chest-tube group minus the no-chest-tube group; positive values indicate higher symptom scores in the chest-tube group. CI, confidence interval.