2-1

Epipleural anesthesia may reduce postoperative pain in lung cancer patients following VATS

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Background

The purpose of this study was to evaluate whether catheter-delivered epipleural anesthesia reduced pain when given in addition to intercostal anesthesia for patients undergoing VATS for stage 1 and 2 lung cancer.

Materials and methods

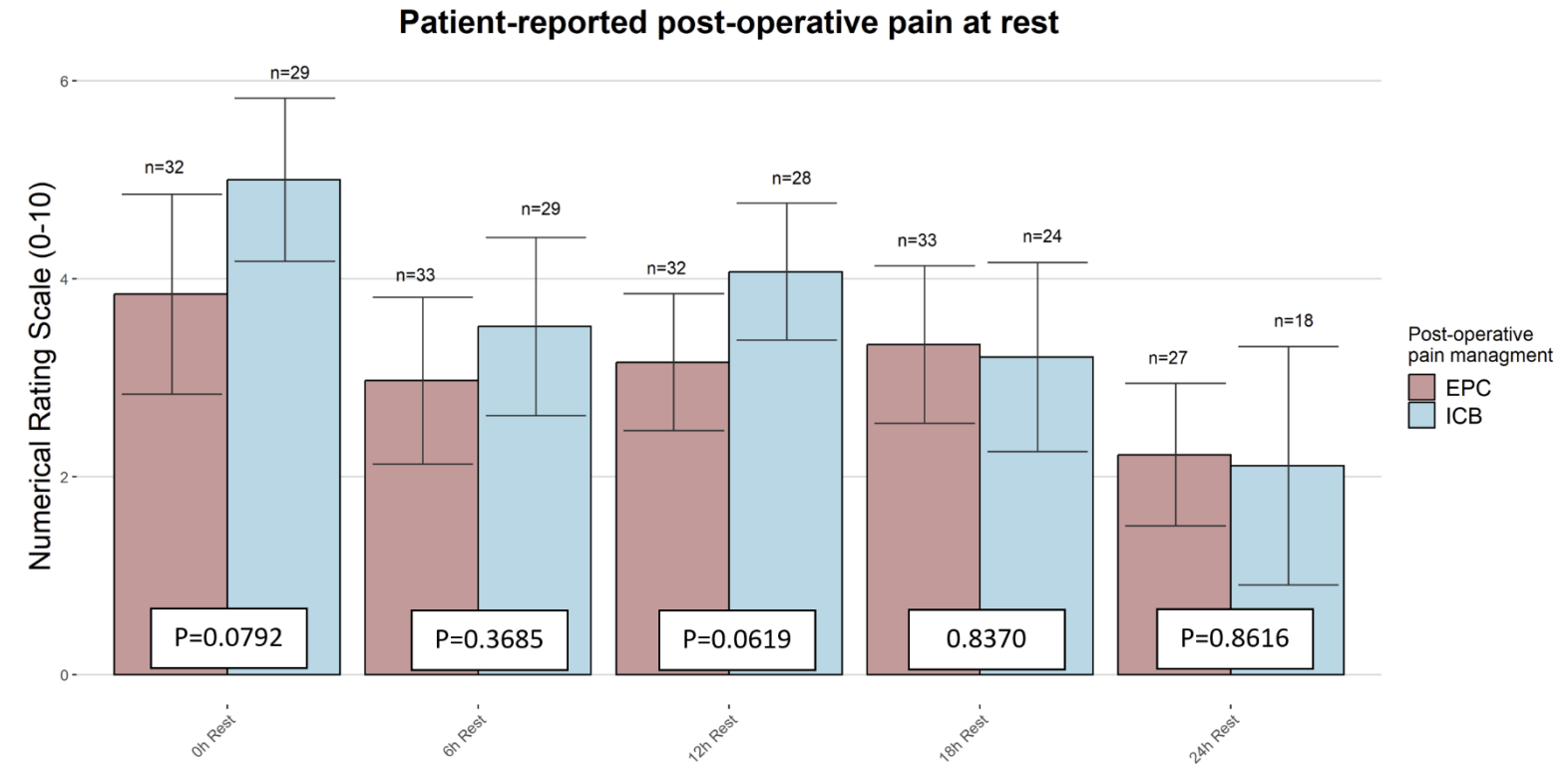
Stage 1 and 2 lung cancer patients scheduled for VATS between August 2023 and March 2024 were randomized to intercostal nerve block (ICB group), or ICB with an epipleural catheter (EPC group) for postoperative administration of local anesthetics every six hours. 20 ml Marcaine 0.25% was administered per-operatively and 15 ml post-operatively through the epipleural catheter. Patient-reported postoperative pain rated by Numerical Rating Scale (NRS), total postoperative 24 hour opioid consumption, and time until first rescue opioid consumption after surgery was assessed.

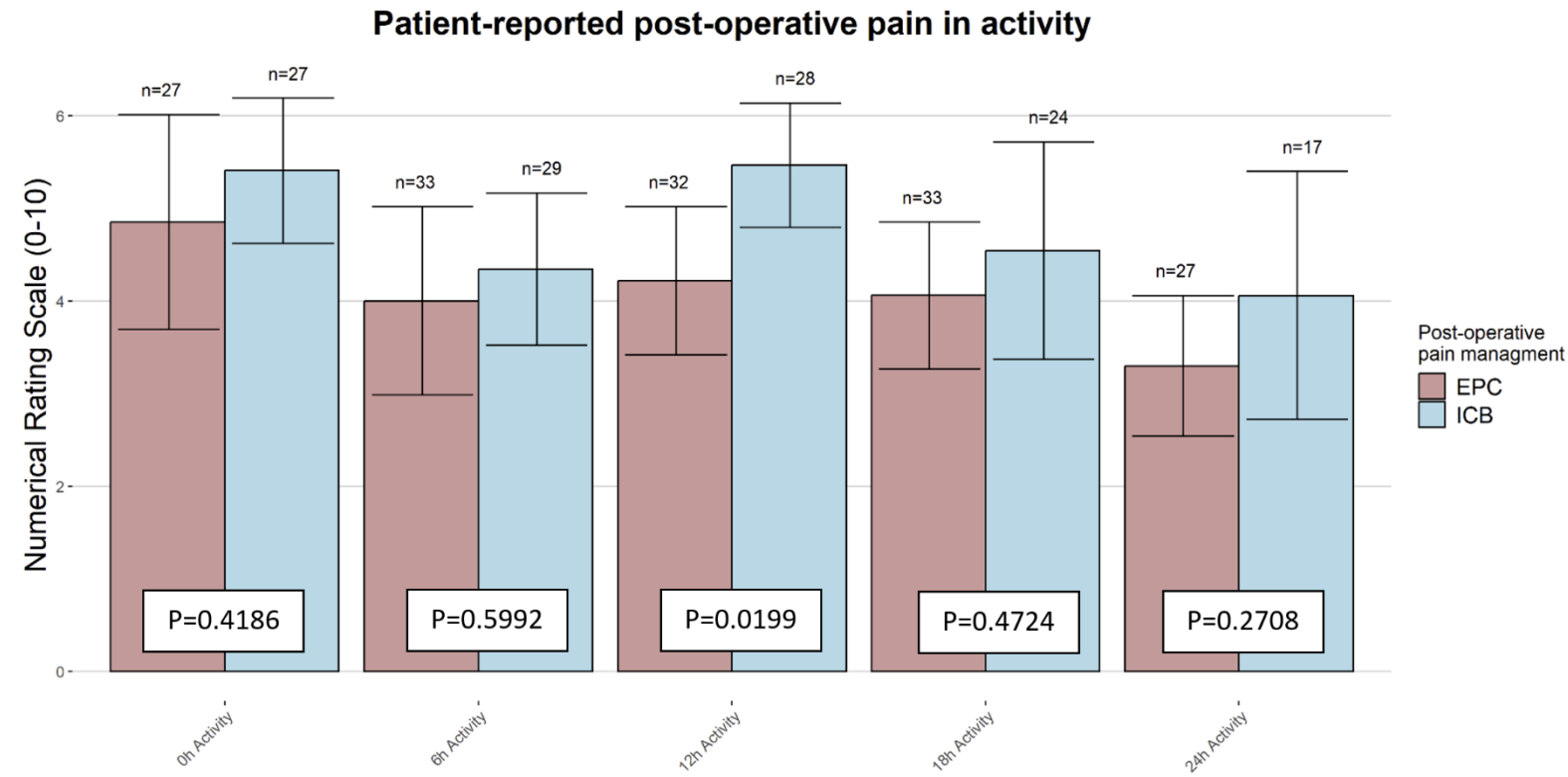
Results

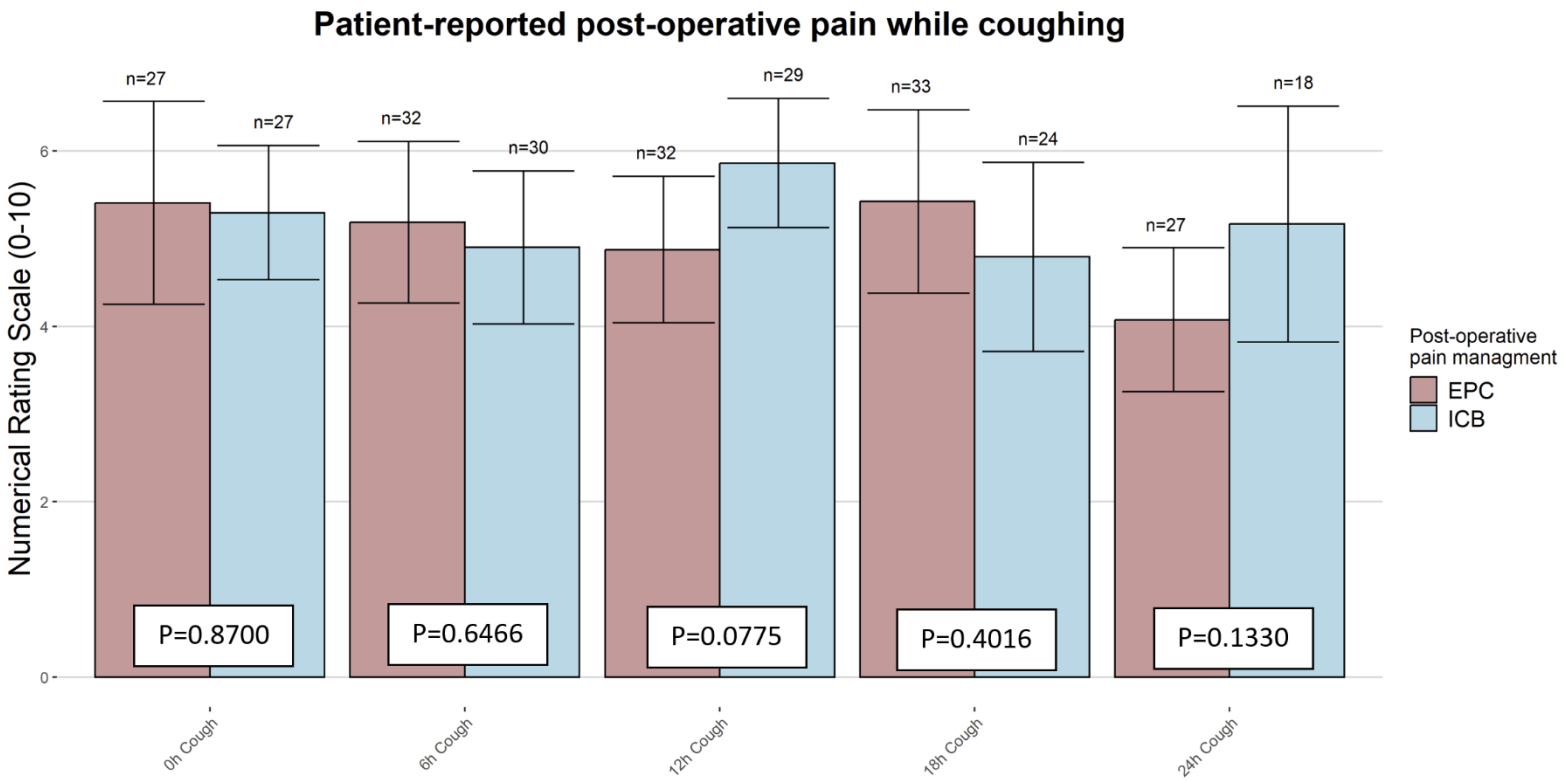
The NRS scores immediately postoperatively in the ICB and EPC groups were 5.00 vs. 3.84 (p=0.08) respectively. The NRS scores 12 hours postoperatively in the ICB and EPC groups were 4.07 vs. 3.16 at rest (p=0.06), 5.46 vs. 4.22 during activity (p=0.02), 5.86 vs. 4.88 while coughing (p=0.08), and 5.35 vs. 4.31 on average since surgery (p=0.07) respectively, showing a possible trend. The differences in NRS scores were non-significant between the two groups for all other data at any timepoint. Moreover, average total 24 h opioid consumption did not differ between the groups, nor did the average time until first rescue opioid. No adverse side effects were reported.

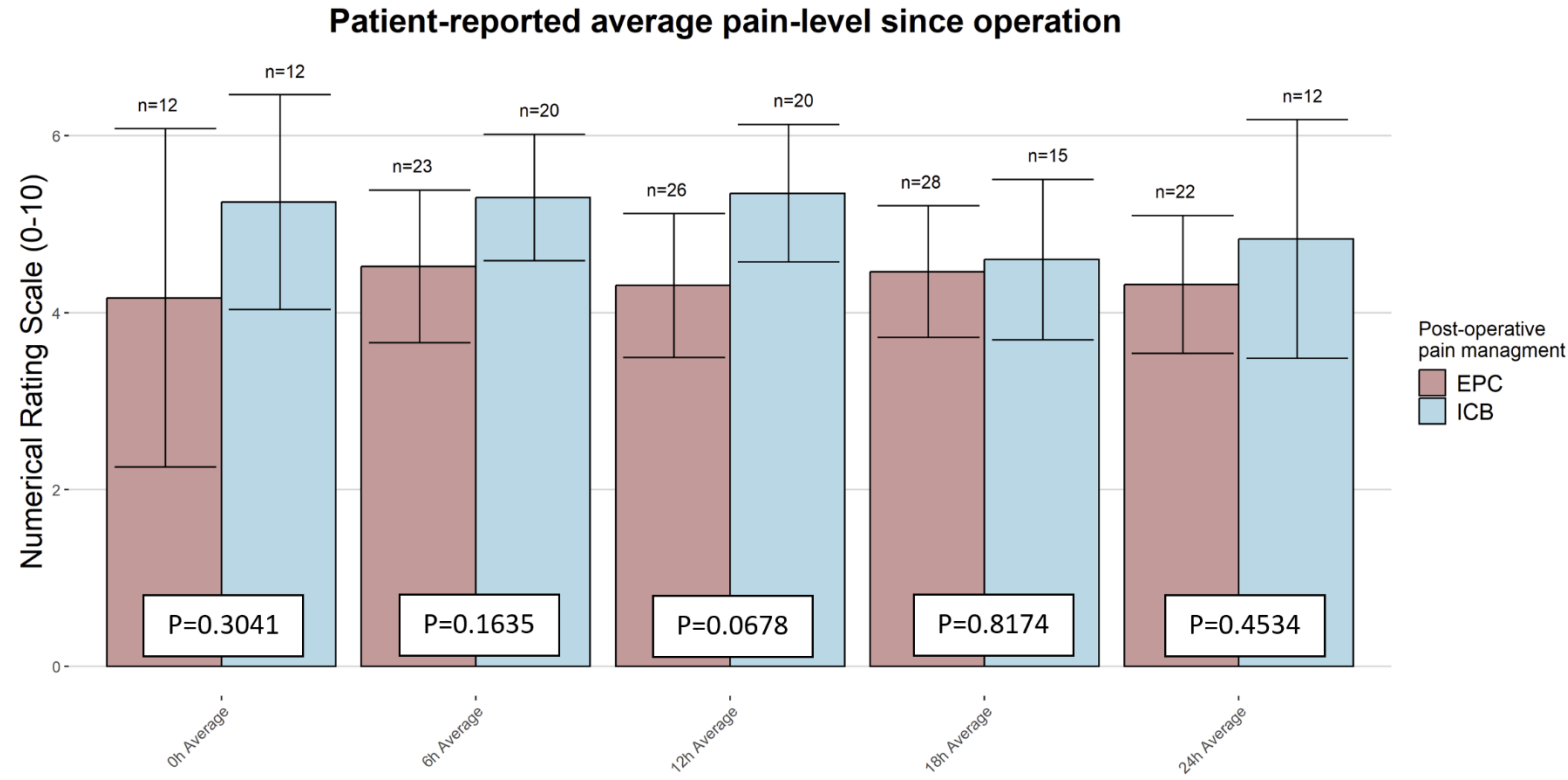
Conclusion

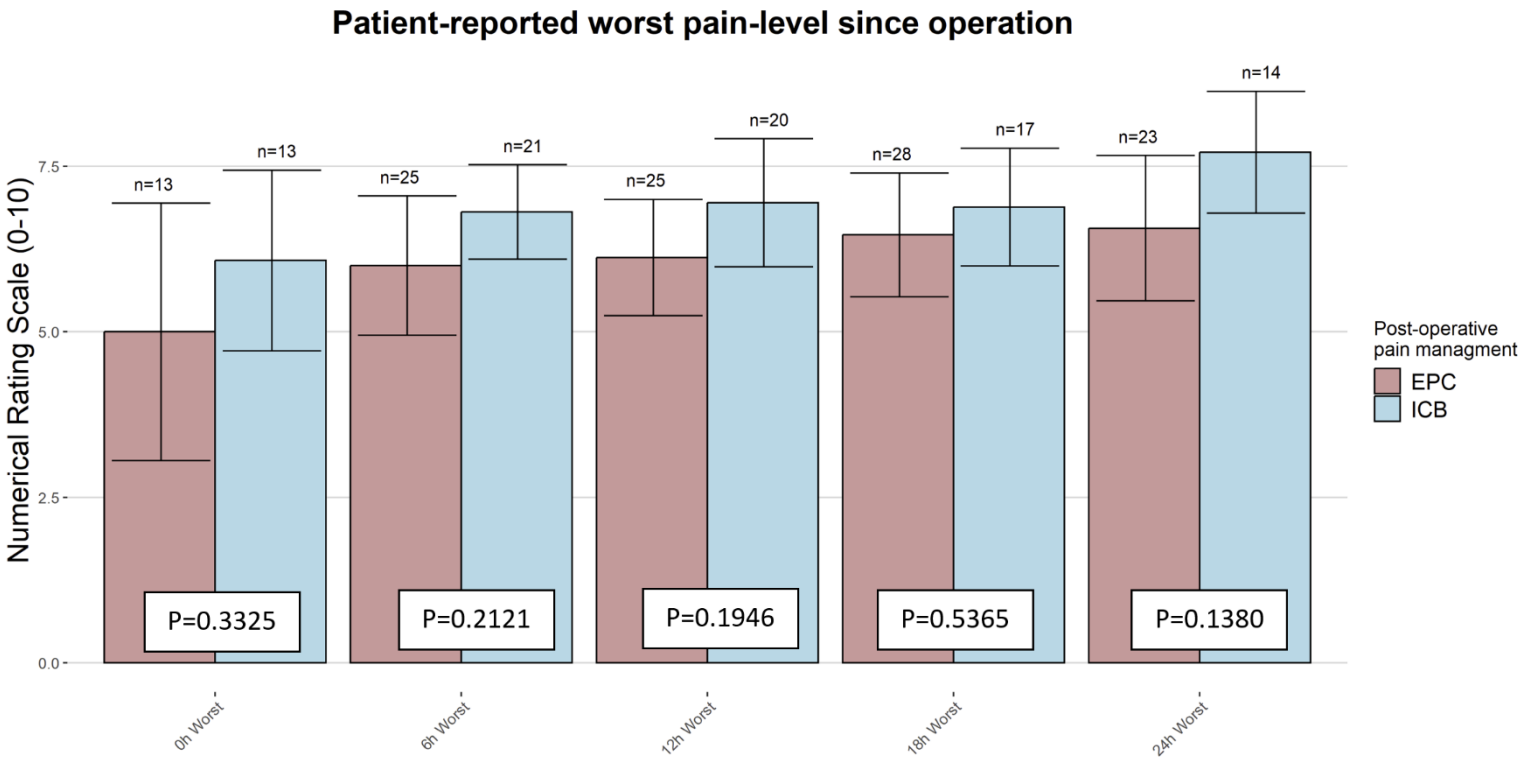
EPC is a safe method for postoperative anesthesia following VATS, and may provide superior pain management when given alongside intercostal nerve block.

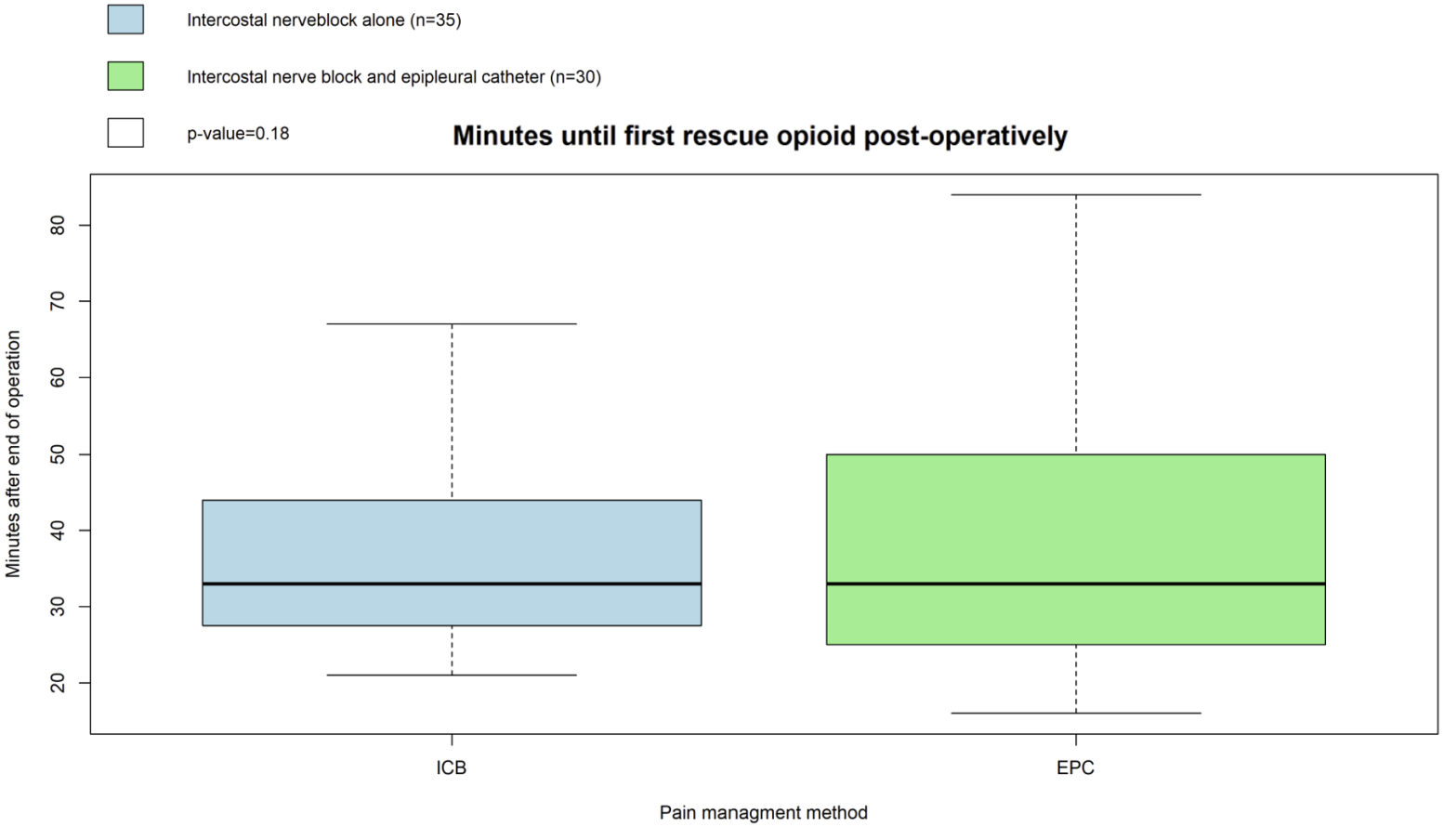

Patient-reported post-operative pain at rest
Numerical Rating Scale (0-10)
0
2
4
6
n=32
n=29
n=33
n=29
n=32
n=28
n=33
n=24
n=27
n=18
P=0.0792
P=0.3685
P=0.0619
0.8370
P=0.8616
0h Rest
6h Rest
12h Rest
18h Rest
24h Rest
Post-operative pain managment
EPC
ICB


Patient-reported post-operative pain in activity
Numerical Rating Scale (0-10)
0
2
4
6
n=27
n=27
n=33
n=29
n=32
n=28
n=33
n=24
n=27
n=17
P=0.4186
P=0.5992
P=0.0199
P=0.4724
P=0.2708
0h Activity
6h Activity
12h Activity
18h Activity
24h Activity
Post-operative pain managment
EPC
ICB


Patient-reported post-operative pain while coughing
Numerical Rating Scale (0-10)
n=27
n=27
n=32
n=30
n=32
n=29
n=33
n=24
n=27
n=18
P=0.8700
P=0.6466
P=0.0775
P=0.4016
P=0.1330
0h Cough
6h Cough
12h Cough
18h Cough
24h Cough
Post-operative pain managment
EPC
ICB


Patient-reported average pain-level since operation
Numerical Rating Scale (0-10)
n=12
n=12
n=23
n=20
n=26
n=20
n=28
n=15
n=22
n=12
P=0.3041
P=0.1635
P=0.0678
P=0.8174
P=0.4534
0h Average
6h Average
12h Average
18h Average
24h Average
Post-operative pain managment
EPC
ICB


Patient-reported worst pain-level since operation
Numerical Rating Scale (0-10)
0.0
2.5
5.0
7.5
n=13
n=13
n=25
n=21
n=25
n=20
n=28
n=17
n=23
n=14
P=0.3325
P=0.2121
P=0.1946
P=0.5365
P=0.1380
0h Worst
6h Worst
12h Worst
18h Worst
24h Worst
Post-operative pain managment
EPC
ICB


Intercostal nerveblock alone (n=35)
Intercostal nerve block and epipleural catheter (n=30)
p-value=0.18
Minutes until first rescue opioid post-operatively
Minutes after end of operation
20
30
40
50
60
70
80
ICB
EPC
Pain managment method

2-2

The 4-year outcome of the ScanCLAD study (Scandinavian multicenter randomized study evaluating if once-daily tacrolimus vs twice-daily cyclosporine, reduces the 3-year incidence of chronic lung allograft dysfunction after lung transplantation)

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Background: The ScanCLAD trial showed a significantly lower incidence of chronic lung allograft dysfunction (CLAD) three years after lung transplantation (LTx) in recipients treated with tacrolimus compared to cyclosporine. Now, we determined CLAD and survival outcomes at four years of follow-up in the trial.

Methods: ScanCLAD is an investigator-initiated, open-label, multicentre, randomised, controlled trial in Scandinavia evaluating whether tacrolimus (once per day) or cyclosporine (twice per day) reduced the incidence of CLAD after de novo LTx. Patients aged 18–70 years who underwent double LTx (DLTx) were randomly allocated (1:1) to receive either oral cyclosporine or oral tacrolimus.

Results: Between 2016 and 2019, 249 patients underwent DLTx and received at least one dose of the study drug and were thus included in the mITT population (138 (55%) men and 111 (45%) women, mean age of 55·2 years, SD 10·2). At 4 years after LTx, CLAD occurred in 54 patients (cumulative incidence 44% [95%CI 35–53]) in the ciclosporin group and 24 patients (20% [14–28]) in the tacrolimus group (HR 0·47 [95%CI 0·28–0·79], log-rank p<0·0030, Fig1). In the per protocol CLAD population (those in the mITT population who also had at least one post-baseline lung function test allowing assessment of CLAD), graft survival was significantly better in the tacrolimus group compared to the cyclosporine group (HR 0·54 [95%CI 0·32–0·96], log-rank p=0·031, Fig2).

Conclusion: Tacrolimus-based immunosuppression once daily significantly reduced the incidence of CLAD compared to cyclosporine twice daily after LTx at three years, which now also was corroborated by 4-year outcome data.

Figure 1

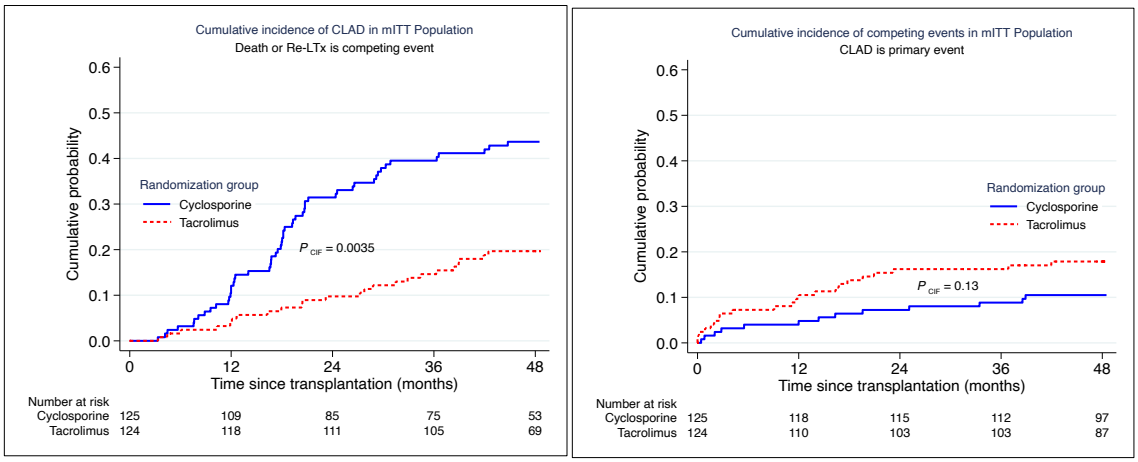
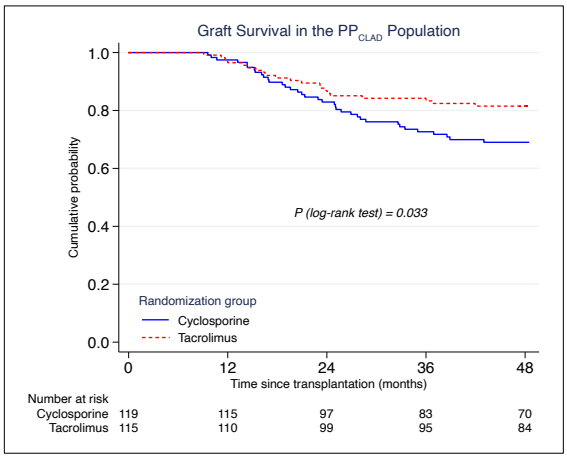


Figure 2



2-3

A Nine-field Matrix of Ventilatory Efficiency in Combination with Peak Oxygen Uptake May Improve Risk Stratification in Patients Undergoing Lobectomy

karolina Kristenson[1], Miklos Boros[1], Eva Tamas[1], Gabriel Högström[2], Kristofer Hedman[3]

[1] 1. Department of Cardiothoracic and Vascular Surgery in Östergötland, and Department of Health, Medicine and Caring Sciences, Linköping University, Linköping, Sweden., [2] 2. Department of Pulmonology in Linköping, and Department of Health, Medicine and Caring Sciences, Linköping University, Linköping, Sweden., [3] 3. Department of Clinical Physiology, and Department of Health, Medicine and Caring Sciences, Linköping University, Linköping, Sweden.

BACKGROUND

Cardiopulmonary exercise testing (CPET) has a pivotal role in preoperative evaluations of patients before lung cancer surgery. We aimed to refine the preoperative risk assessment with CPET before cancer lobectomy by using a combination of two well-established CPET variables: percent of predicted peak oxygen uptake (%-VO2peak) and ventilatory efficiency (VE/VCO2-slope) and applying recently defined optimal threshold values for each variable.

METHODS

Single center, retrospective analysis of 138 patients with lung cancer who underwent lobectomy and preoperative CPET in 2008-2020. Main outcome was any major pulmonary complications (MPC) or death within 30 days of surgery. By receiver operating characteristic analysis, a lower 90% sensitivity and an upper 90% specificity threshold in relation to the main outcome were determined for %-VO2peak and VE/VCO2-slope. For each measure and based on these thresholds, patients were categorized into three groups, yielding a proposed nine-field matrix for risk assessment. The frequency of complications between groups was compared using Chi2.

RESULTS

Overall, 23 patients (17%) suffered an MPC or died (two deaths). The frequency of complications differed between the nine-field matrix CPET groups (p=0.006, figure 1). Importantly, patients with low (<15%), intermediate-low (15-24%), intermediate-high (25-50%) and high risk (>50%) could be identified when combining the two measures and new thresholds.

CONCLUSION

A nine-field matrix for risk assessment based on %-VO2peak and VE/VCO2-slope seem to identify individuals with low, intermediate-low, intermediate-high, and high risk of major complications within 30 days of cancer lobectomy. These results are promising but require validation in a larger cohort.

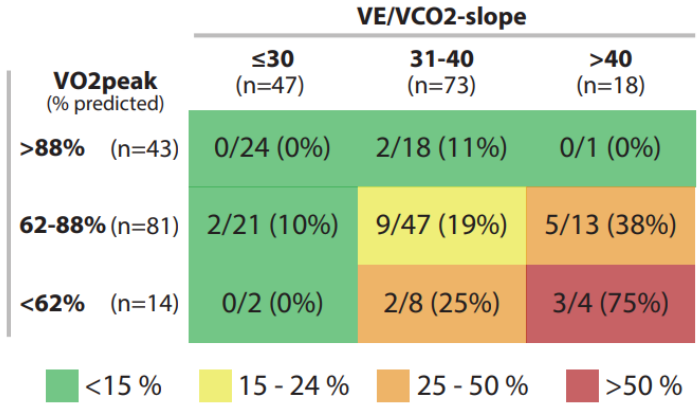


Figure 1. Proportion of major pulmonary complications or death within 30 days of lung cancer surgery (lobectomy) per category of peak oxygen uptake (VO2peak) and ventilatory efficiency (VE/VCO2-slope) in 138 patients. Chi2 p-value 0.006.

2-4

Recurrent lung cancer after pulmonary resection with curative intent for non-small cell cancer in Iceland

Daniel Myer[1], Viktor Asbjornsson[1], Matthildur Magnusdottir[1], Leon Heitmann[1], Gudrun Oskarsdottir[2], Hronn Hardardottir[2], Orvar Gunnarsson[3], Tomas Gudbjartsson[3]

[1] Faculty of medicine, University of Iceland, [2] Department of Pulmonology, Landspitali Univeristy Hospital, [3] Department of Cardiothoracic surgery, Landspitali University Hospital

Introduction: Up to one third of non-small cell lung cancer (NSLCL) patients are treated with pulmonary resection with curative intent. Most studies have focused on short-term and overall long-term survival following surgery. Our aims were therefore to investigate the incidence and timing of recurrent NSCLC after surgery in a whole-nation patient-cohort, with focus on patient outcomes.

Materials-and-methods: This was a retrospective population-based study on 993 NSLCS-patients operated at Landspitali 1991-2022. Data were collected from medical records, including timing of recurrence, TNM7-staging, overall survival (Kaplan-Meier) and demographics compared for patients with and without recurrence. Predictors of recurrence were assessed with Cox-multivariate analysis. Average follow-up was 65.2 months.

Results: Out of 993 patients, 37%, 22%, 15%, 12% and 15% were on stage IA, IB, IIA, IIB and IIIa, respectively. Altogether 400 (40%) patients were diagnosed with recurrent-NSCLC; 23%, 37%, 61%, 53% and 61% on stages IA, IB, IIA, IIB and IIIA respectively. The median time to recurrence was 13.8 months (95% CI: 6.8-29.3 months) and the incidence declined over time (36% vs. 48% in 2015-2022 vs. 1991-1998, respectively). Five-year survival for recurrent vs. non-recurrent NSCLC was 24% vs. 72%, and 43% vs. 78% on stage IA, respectively. The strongest predictors for recurrent NSCLC were higher TNM-stage, large-cell carcinoma, female sex and operation in earlier years of the study-period.

Conclusion: Recurrent NSCLC was detected in 40% of patients and associated with inferior survival. Notably, about one-third of stage-I patients had recurrent NSCLC, where adjuvant chemotherapy has not been applied.

2-5

Long-Term Atrial Fibrillation Burden in Patients After MAZE Procedure

Evan Starr[1], John Doty[1]
[1] Intermountain Medical Center

Background:

Atrial fibrillation (AF) is a common condition increasing in prevalence worldwide. Management includes rate or rhythm control with medication and escalates to catheter or surgical ablation. However, the true incidence or continuous “burden” of AF post-ablation is not well described. Failure of ablation has been defined as any recurrence of AF >30 seconds.

Materials and Methods:

135 patients underwent surgical ablation over a 10-year period. Continuous rhythm monitors (LINQ Reveal, Medtronic Inc.) were implanted in 60 patients and another 29 patients received permanent pacemakers. These devices were interrogated at 3 and 6 months and annually to assess ongoing AF burden.

Results:

At 3 months, 81% of patients had <10% cumulative AF burden and 68% had a <1% cumulative AF burden. At 6 months, 86% had an AF burden <10% and 75% of patients had an AF burden <1%. Cumulative AF burden <10% at each subsequent year interval was fairly consistent with 82% at 1 year, 88% at 2 years, 86% at 3 years, 84% at 4 years and 80% at 5 years. On average, 3-15% of patients had >90% AF burden at each interval (Table 1).

Conclusion:

Continuous rhythm monitoring demonstrates durable success of surgical ablation with most patients having no or minimal recurrent AF. Consideration should be given to overall AF burden in the management of patients after surgical ablation, including possible discontinuation of anticoagulation and anti-arrhythmic therapy in select patients.

AF Burden (n=77)	6w	3m	6m	1Y	2Y	3Y	4Y	5Y
<1%	36	43	49	37	26	17	9	8
1-10%	7	8	7	7	5	2	2	0
11-50%	4	6	5	6	1	0	0	1
51-90%	6	1	1	1	2	1	0	0
>90%	6	5	3	3	1	2	2	1
Total	59	63	65	54	35	22	13	10

2-6

Earlier detection of perioperative myocardial infarction after cardiac surgery

Zineb Chaabi[1], Linnea Molander[1], Ola Hammarsten[1], Björn Redfors[1], Anders Jeppsson[1]
[1] Sahlgrenska University Hospital

Background

Early detection of perioperative myocardial infarction (PMI) increases the possibilities to initiate countermeasures. We investigated if high-sensitive troponin I (hsTnI) already 3h after completed surgery identifies patients with PMI.

Methods

334 patients without recent preoperative myocardial infarction (MI) who underwent CABG and/or valve surgery at Sahlgrenska University Hospital 2022-2023, were included in a prospective, observational study. hsTnI was measured 3h and the day after surgery. In accordance with the European consensus statement, PMI was defined as hsTnI>500 times the upper reference limit (URL), or hsTnI 35-500xURL with supportive signs of MI, on day 1. Youden's index was used to calculate the optimal cut-off level 3h after surgery. Positive and negative predictive values, sensitivity and specificity and C-statistics for the 3h measurements were calculated. Correlation was calculated with Spearman's test.

Results

PMI was detected in 15/334 patients. Median hsTnI concentration 3h after surgery was 1900 (1000-3600) ng/L and 2400 (1200-4800) ng/L on day 1. The correlation coefficient between 3h and day 1 measurements was 0.82 ($p<0.001$). The optimal cut-off level after 3h was 6550 ng/L, corresponding to 252xURL. The positive and negative predictive values for this cut-off level were 37% and 99% respectively, and the sensitivity and specificity were 81% and 93% respectively. The area under the ROC-curve was 0.87 (95% CI: 0.75-1.00).

Conclusion

hsTnI three hours after cardiac surgery identifies patients with PMI with high negative but limited positive predictive value. In practise, a hsTnI level <6550 ng/L 3h after surgery excludes perioperative MI.

2-7

Incidence of, Predictors for, and Outcomes following Primary Graft Dysfunction after Cardiac Transplantation

Isabella Lepore[1], Jonatan Oras[1], Andreas Wallinder[1], Aldina Pivodic[1], Göran Dellgren[1]
[1] Sahlgrenska Univ Hospital

Introduction

The aim of this study was to determine the incidence of primary graft dysfunction (PGD) and its impact on short-term outcome after heart transplantation (HTx).

Patients and Methods

A total of 830 consecutive patients that underwent HTx in our center between 1984 and 2021 were retrospectively reviewed. Of these 163 were excluded (age <18 years, n=103, missing data, n=60), and the main analysis included 667 (80.4%) adult patients. The ISHLT graft dysfunction criteria were applied.

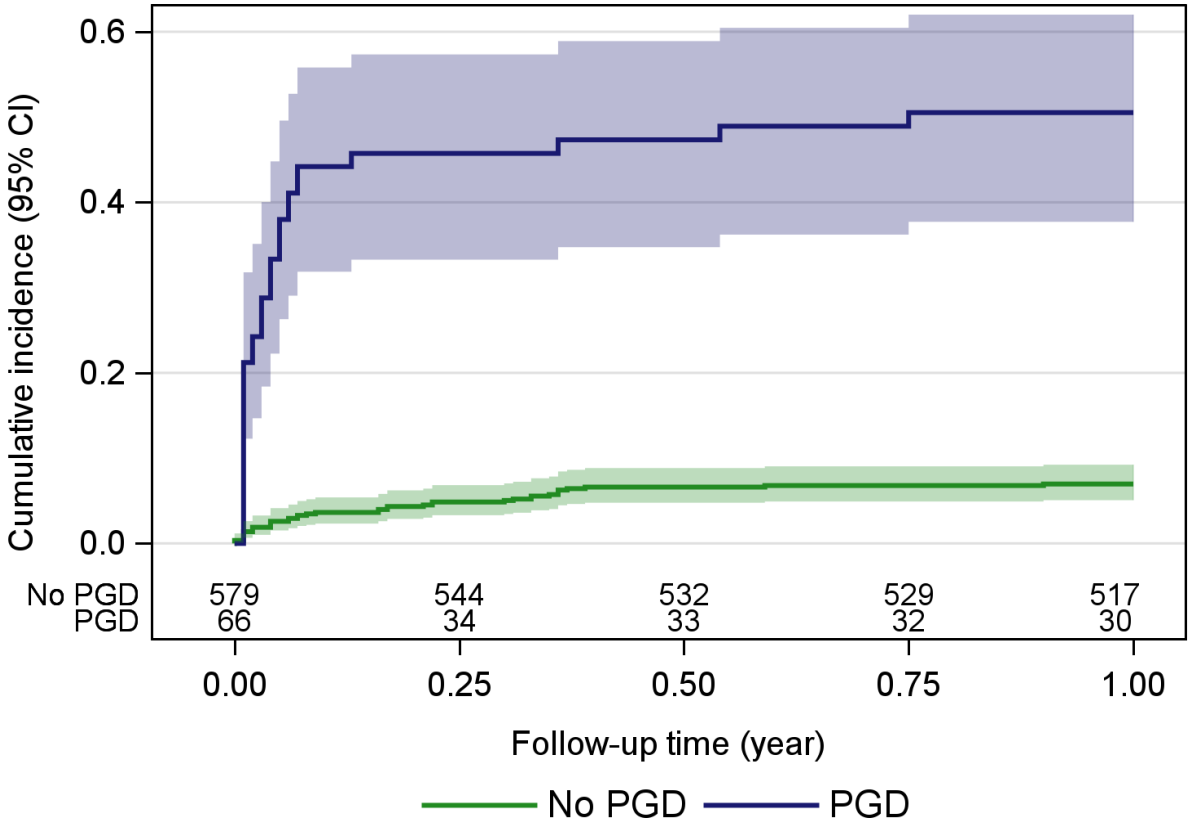
Results

Of the 667 analyzed patients, 70 (10.5%) fulfilled PGD criteria whereof 41 (6.1%) had left ventricular (LV) PGD and 29 (4.3%) had right ventricular (RV) PGD. Patients with PGD were younger (46 vs 50 years, p=0.03), had more frequent pre-transplant dialysis, mechanical circulatory support (MCS) or previous cardiac surgery. No donor factor was associated with recipient PGD. Longer time on by-pass was the only intraoperative variable associated with PGD. Patients with PGD had post-operative longer duration of mechanical ventilation and longer ICU stay. They had more frequently postoperative MCS, continuous renal replacement therapy, repeated surgery and sepsis. Mortality and re-transplant rates at 30 days were higher in patients with compared to without PGD (n=30 [45%] vs n=19 [3%]) and after one year (n=34 [51%] vs n=44 [8%]) (HR 6.89 (95% CI 4.01 to 11.83), p<0.0001).

Conclusion

We have demonstrated that primary graft dysfunction, using the ISHLT 2014 definitions, following HTx, was related to poor prognosis in terms of both 30-day and 1-year survival rates.

Figure



Cumulative incidence for time to all-cause mortality or re-Tx during first year by PGD

2-8

A Posterior Pericardial Chest Tube is Associated with Reduced Incidence of Postoperative Atrial Fibrillation after Cardiac Surgery

Luis Rabelo, Igor Zindovic[1], Daniel Åström[2], Egill Þorsteinsson, Johan Sjögren[1], Kristjana Ólafsdóttir, Matthildur Magnúsdóttir, Anders Jeppsson, Tómas Guðbjartsson

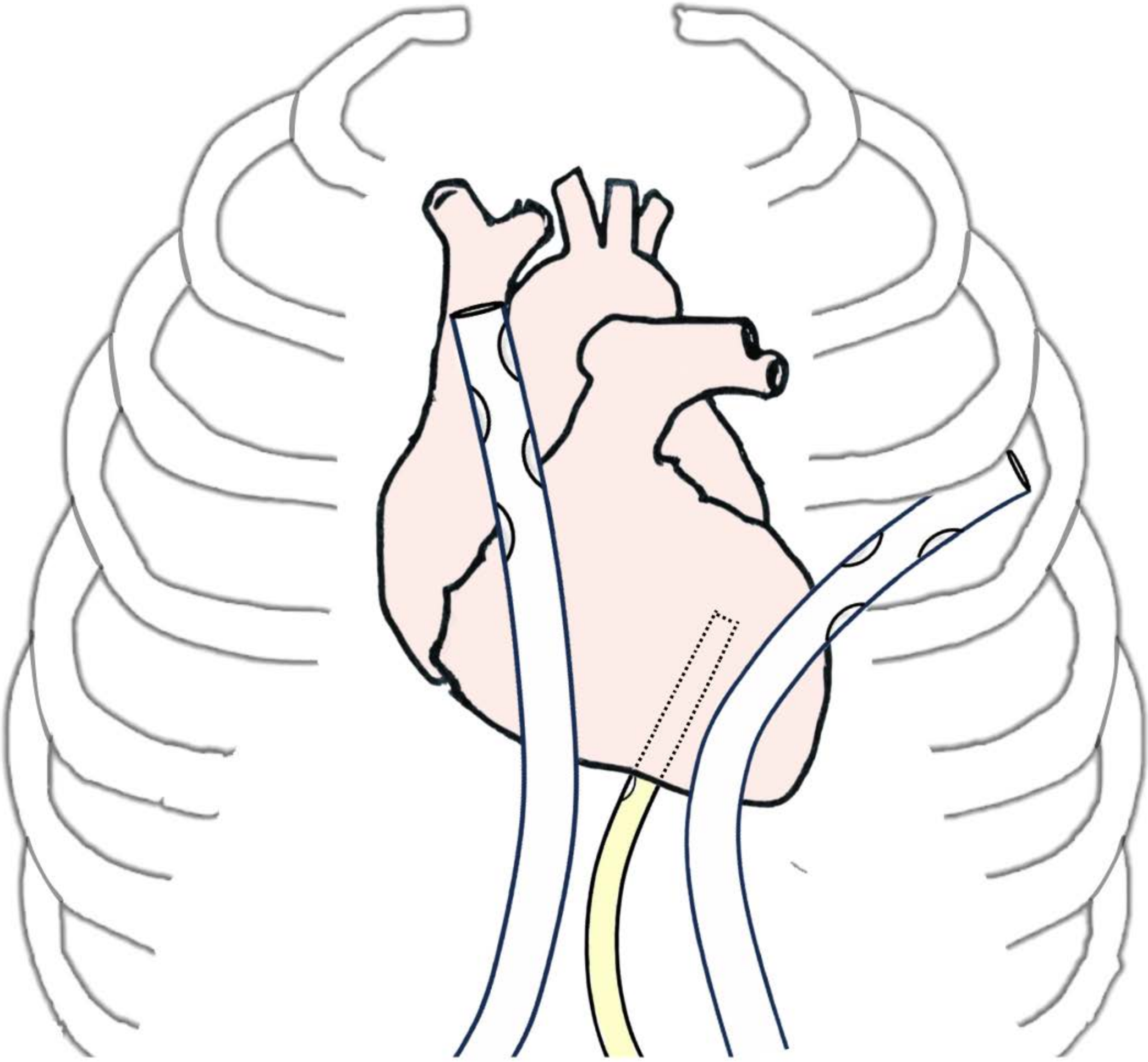
[1] Skåne University Hospital, [2] Lund University

Background: Postoperative atrial fibrillation (POAF) is a common complication after cardiac surgery associated with other adverse outcomes. Recent studies have shown that drainage of pericardial effusion by a posterior pericardial incision reduces the incidence of POAF. Alternative approach is a chest tube placed posteriorly in the pericardium. We evaluated if the use of a posterior pericardial drain was associated with reduced risk of POAF in patients undergoing coronary artery bypass graft (CABG) and/or aortic valve replacement (AVR).

Materials and methods: This observational study included 2,535 patients who underwent CABG(n=1,997), AVR(n=293), or combined CABG and AVR (n=245) in Iceland from 2002-2020. From our study population, 553(22%) received a 20Fr posterior pericardial chest tube in addition to standard mediastinal and left pleural drains. The incidence of POAF in patients with and without a posterior pericardial drain was compared before and after 1:1 propensity score-matching.

Results: Of 2,535 patients, 1,106 were included in the matched cohort. The incidence of POAF was lower in patients receiving posterior pericardial chest tube drainage compared to the control group, both before (34% vs. 43%, p<0.001) and after (34% vs. 44%, p<0.001) matching. In a multivariable analysis, posterior pericardial chest tube drainage was independently associated with a reduced risk for POAF (adjusted odds ratio 0.66 [95%CI 0.51-0.86], p=0.002).

Conclusions: This study demonstrated that posterior pericardial chest tube drainage is associated with a significant reduction of POAF following routine cardiac surgery. The results are hypothesis-generating and must be confirmed in prospective randomized trials.



2-9

Cardiovascular medications and outcome after ascending aortic aneurysm surgery

Emily Pan[1], Susanne Nielsen[2], Göran Dellgren[2], Charlotta Törngren[2], Anders Jeppsson[2], Andreas Martinsson[2]
[1] Central Finland Hospital Nova, [2] Sahlgrenska University Hospital

Background

Although no medication has proven to halt or prevent the development of aortic aneurysms, a substantial proportion of patients with aneurysms are treated with cardiovascular medications because of co-morbidities. We utilized nationwide registries to study the associations between cardiovascular medications and outcomes after ascending aortic surgery.

Materials and methods

All patients that underwent elective, first-time, ascending aortic surgery in Sweden 2007-2020 were included. The baseline was set at six months after discharge. Five nationwide registries were merged to collect time-updated information on dispensed cardiovascular medications, individual patient data and outcomes. Multivariable Cox regression analyses adjusted for age, sex, patient characteristics, co-morbidities and other cardiovascular medications were performed to study the associations between dispensed RAS-inhibitors, cardioselective beta-blockers, antiplatelets, statins, and outcomes. The endpoints analyzed were all-cause mortality, cardiovascular mortality, myocardial infarction, stroke, and aortic re-interventions.

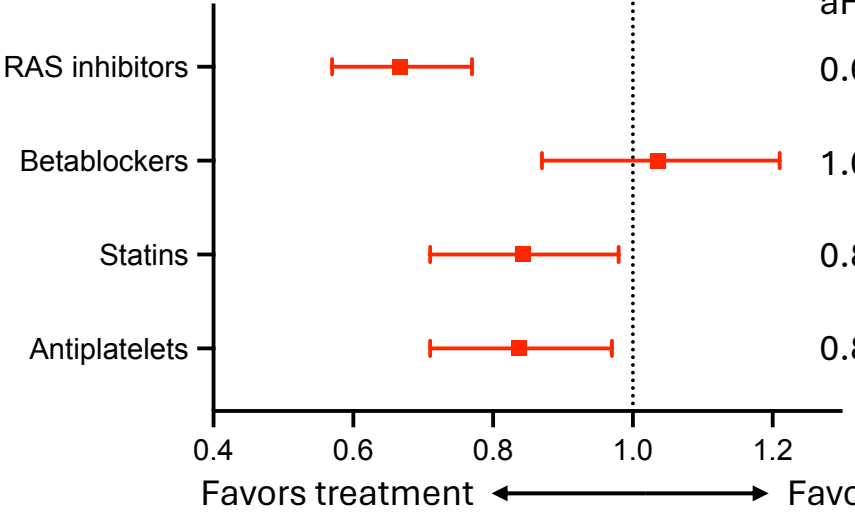
Results

At baseline, 61.3% (3088/5040) were dispensed RAS-inhibitors, 81.2% (4093/5040) beta-blockers, 46.0% (2320/5040) antiplatelets, and 42.9% (2161/5040) statins. Patients with ongoing use of RAS-inhibitors (HR 0.66 [0.57-0.77], p<0.001), antiplatelets (HR 0.83 [0.71-0.97], p=0.017) and statins (HR 0.84 [0.71-0.98], p=0.029), but not beta-blockers, were associated with significantly reduced all-cause mortality. Ongoing use of cardiovascular medications was not significantly associated with cardiovascular mortality, myocardial infarction, stroke, or aortic re-interventions.

Conclusion

In this population-based study, continuous use of RAS inhibitors, beta-blockers and antiplatelets were associated with lower all-cause mortality after elective ascending aortic surgery. Randomized trials are needed to confirm causal associations.

All-cause mortality



	aHR	(95% CI)	p-value
RAS inhibitors	0.66	(0.57-0.77)	<0.001
Betablockers	1.03	(0.87-1.21)	0.75
Statins	0.84	(0.71-0.98)	0.029
Antiplatelets	0.83	(0.71-0.97)	0.017

2-10

24 years of pericardiectomy for constrictive pericarditis in Sweden; short- and long-term outcomes

Sebastian Sartipy[1], Susanne J. Nielsen[1,2], Carl Johan Malm[1], Göran Dellgren[1,3], Emma C. Hansson[1,2]

[1] Department of Cardiothoracic Surgery, Sahlgrenska University Hospital, Gothenburg, Sweden, [2] Department of Molecular and Clinical Medicine, University of Gothenburg, Sweden, [3] Department of Surgery, University of Gothenburg, Sweden

Background

Constrictive pericarditis, a rare cause of heart failure, results from restricted diastolic relaxation due to fibrotic changes to the pericardium. Pericardiectomy is the only curative treatment. However, factors contributing to variation in outcome remain poorly understood. Therefore, we explored short- and long-term outcomes in Swedish patients undergoing pericardiectomy for constrictive pericarditis.

Materials and methods

This retrospective, nation-wide study included all pericardiectomy procedures for constrictive pericarditis in Sweden between the years 1997-2020 (n=175, mean age 59 +/- 15 years). In addition, controls from the Swedish general population matched on age and sex were included (n=630). Data were collected from the SWEDEHEART registry and two other mandatory registries. The median follow-up time was 5.8 (IQR 2.5-10.1) years.

Results

Extracorporeal circulation was utilized in 47% of cases and 26% of patients underwent concomitant cardiac surgery. In the pericardiectomy cohort, 30-day mortality rate was 5.1% and associated with older age at surgery (p=0.008). During follow-up, 22% of patients were readmitted because of heart failure, with preoperative atrial fibrillation as a predicting factor (p<0.001). Additionally, a trend towards improved survival for patients operated between 2010-2020 compared to 1997 2009 was observed (p=0.066). Pericardiectomy patients had more baseline comorbidities and poorer survival compared to the Swedish population controls.

Conclusion

Constrictive pericarditis is a rare disease, and patients often suffer from comorbidities which affect outcomes after surgery. Advancements in overall treatment of these patients over the last decade may have contributed to a trend of improvement in survival rates.