Trends in incidence of deep sternal wound infection and long-term mortality after cardiac surgery

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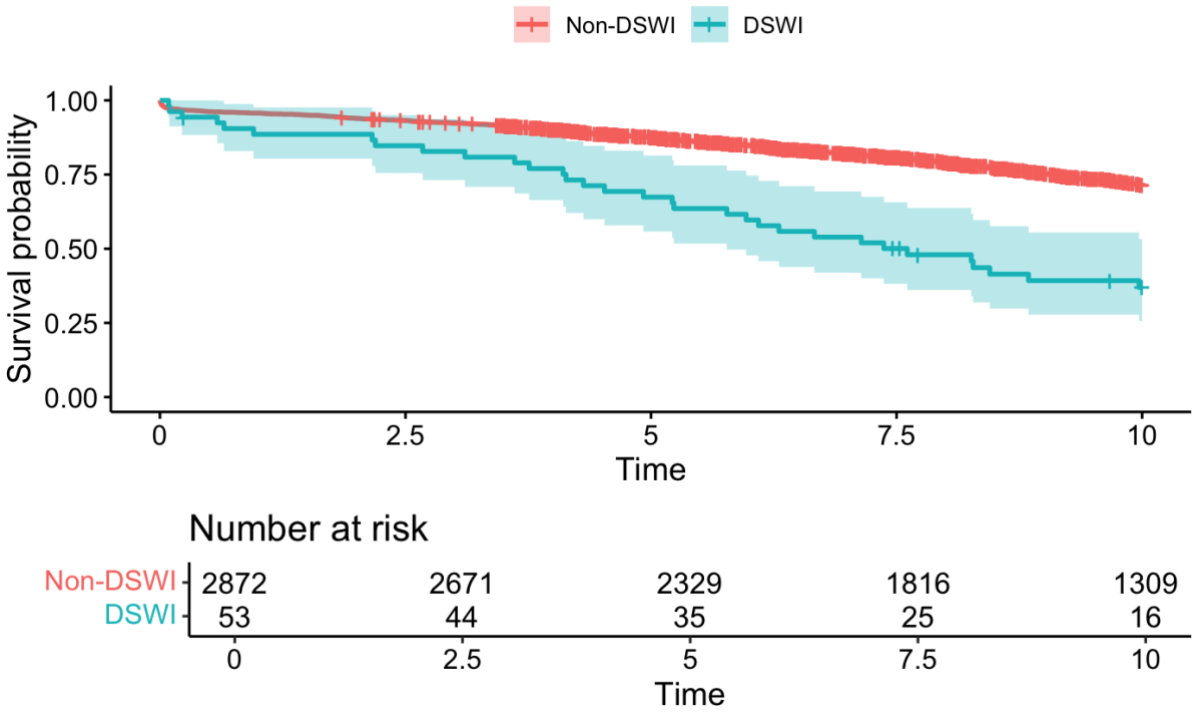
Background: While early outcomes of deep sternal wound infection (DSWI) after cardiac surgery are well documented, its association with long-term outcomes remains less clear. We aimed to investigate trends in DSWI incidence in a whole-nation cohort and evaluated its association with long-term survival.

Methods: This observational study investigated all patients who developed DSWI after cardiac surgery via sternotomy at our institution from 2001 -2024. To evaluate long-term survival, the DSWI cohort was compared with a separate control group that underwent similar cardiac operations during the same time frame. Cox regression with time-splitting was utilized to evaluate long-term survival (5-10 years), adjusting for risk factors.

Results: Out of 4596 patients who underwent cardiac surgery via median sternotomy, 53 (1.2%) developed DSWI. The incidence of DSWI declined during the latter half of the study, from 1.6% (2001-2012) to 0.51% (2013-2024)($p<0.001$), with no cases identified after 2017. DSWI was treated with negative pressure wound therapy in 32 patients (59%), or all patients after 2004. Compared to the non-DSWI cohort, DSWI patients were older (median 70 vs. 68 years) and had higher comorbidity rates. Patients in the DSWI group had twofold higher risk of long-term mortality (5-10 years) compared to non-DSWI patients (aHR = 2.0, 95%CI=1.2-3.3).

Conclusions: Rates of DSWI after cardiac surgery in Iceland have significantly decreased over the last 24 years, with no cases in the last seven years of the study period. However, DSWI remains associated with higher mortality rates 5-10 years after cardiac surgery.


Non-DSWI
DSWI
Survival probability
1.00
0.75
0.50
0.25
0.00
0
2.5
5
7.5
10
Time

Number at risk
Non-DSWI
DSWI
2872
2671
2329
1816
1309
53
44
35
25
16
0
2.5
5
7.5
10
Time

Does Donor Age ≥70 vs <70 Affect Lung Transplantation Outcomes?

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Objective

For lung transplantation (LTx) we are lacking long-term outcomes using older donors. The aim of our study was to evaluate our cohort regarding the use of donors ≥70 compared to <70 after LTx.

Methods

In a retrospective single-centre study including all LTx performed between 2006 and 2024 (n=740) we compared short and long-term mortality and re-transplantation between groups based on donor age above or below 70 years.

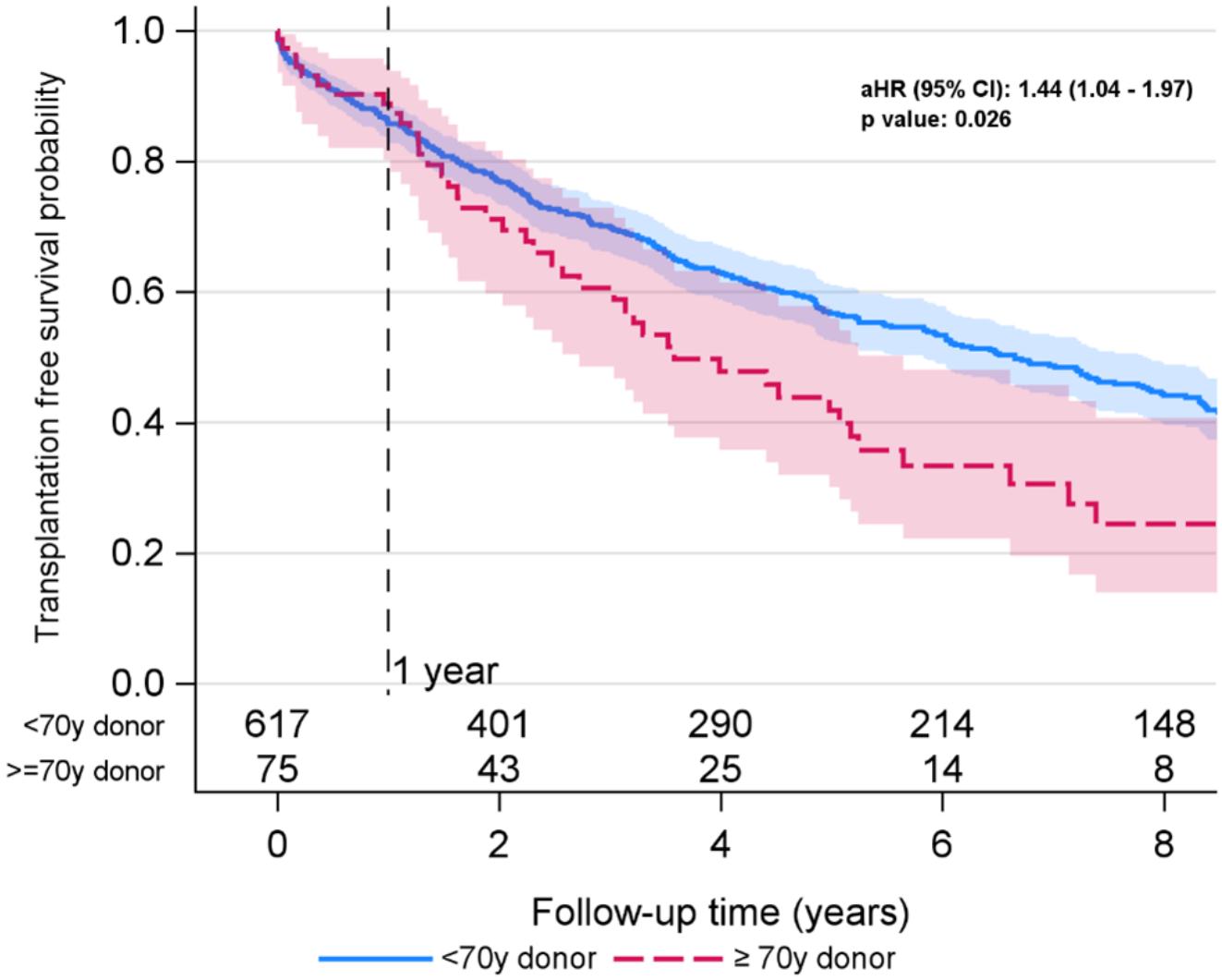
Results

Recipients with older donors (n=76, 10.3%) were older (60.3±9.5vs 52.4±14.3, p<0.0001), shorter (p=0.023), had a larger proportion with a history of smoking (p=0.0092) and a lower preoperative FEV1 (p=0.013). Older donors were more often women (p=0.004), had a shorter donor height (p<0.0001) and the cause of death was more frequently intracranial hemorrhage (p=0.0002).

1-year mortality was comparable (donors <70 13.1%, donors ≥70 11.8%, p=0.76). FEV1 at 1 year was higher in recipients with younger donors (p=0.0077). In a Cox regression analysis recipient age (p>0.0001), BMI (p=0.031), donor age (per 10 y, p=0.029) and donor age ≥70 (p=0.026) were significantly associated with long-term mortality. Overall survival was lower for recipients with older donors (aHR (95% CI): 1.44 (1.04-1.97) p=0.026). After propensity score matching differences remained with poorer survival in recipients with older donors (HR (95% CI): 1.85 (1.13 -3.03), p=0.014).

Conclusion

This study shows that 1-year survival using grafts from donors older than 70 years of age is comparable to those of younger donors, but long-term survival is inferior which indicates that grafts from older donors should be used in selected LTx patients.


aHR (95% CI): 1.44 (1.04 - 1.97)
p value: 0.026
Transplantation free survival probability
1.0
0.8
0.6
0.4
0.2
0.0
1 year
<70y donor
>=70y donor
617
75
401
43
290
25
214
14
148
8
0
2
4
6
8
Follow-up time (years)
<70y donor
≥ 70y donor

Circulating biomarkers for identification of diffuse myocardial fibrosis in aortic stenosis?

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Background: Diffuse myocardial fibrosis (DMF) develops early in aortic stenosis (AS) and may be reversible. While traditionally assessed via histopathology or cardiac magnetic resonance imaging (CMR), identifying circulating biomarkers could allow earlier detection of myocardial remodeling.

Aim: To evaluate whether circulating biomarkers reflect DMF, as assessed by histopathology or CMR, in patients with AS.

Methods: Adult patients with isolated AS, scheduled for surgical aortic valve replacement (AVR) were prospectively enrolled between 2014-2020. Prior to surgery, participants underwent CMR, transthoracic echocardiography and blood sampling. 24 biomarkers related with extracellular matrix turnover, myocyte stress and inflammation were analyzed using Meso Scale Discovery immunoassays. Biomarker levels were correlated with CMR parameters (T1 and T2 relaxation times), extracellular volume fraction (ECV) and with collagen volume fraction (CVF) obtained from intraoperative myocardial biopsies.

Results: A total of 39 patients (25 men, mean age 66±9 years) were included. Biomarker-DMF correlations are visualized in Figure 1. Among CMR parameters, T1 relaxation time was negatively correlated with matrix metalloproteinase-2 ($r = -0.36$, $p = 0.02$), while T2 time was correlated to TNF-α ($r = 0.35$, $p = 0.03$). ECV showed positive correlations with galectin-3 ($r = 0.46$, $p < 0.01$) and annexin A1 ($r = 0.43$, $p < 0.01$), and a negative correlation with ST2 ($r = -0.36$, $p = 0.02$). CVF correlated with FABP3 ($r = 0.34$, $p = 0.03$).

Conclusion: Circulating biomarkers may capture molecular alterations that characterise DMF in AS. Future studies should validate the utility of proteomic profiling for early detection of DMF.

Figure 1. Correlation heat map of circulating biomarkers and traditional methods for identification of diffuse myocardial fibrosis. Numbers represent Pearson's R. *P-value <0.05. **P-value < 0.01.

Kidney Function Decline After Cardiac Surgery: A Multicenter Analysis

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Background

Chronic kidney disease (CKD) is a well-established risk factor for adverse outcomes following cardiac surgery. However, long-term kidney function trajectories in this population remain poorly characterized. This study aimed to describe CKD progression and kidney failure in cardiac surgery patients with preexisting kidney impairment.

Methods

This retrospective study analyzed 27,485 Danish adult cardiac surgery patients from Odense University Hospital (2000–2022) and Aarhus University Hospital (2008–2024), including 3,504 patients with preexisting CKD (stages G3a–G5). Baseline kidney function was calculated using the 2021 CKD-EPI equation. Three KDIGO-defined outcomes were assessed: rapid progression (eGFR decline ≥5 mL/min/1.73m²/year), CKD stage progression (≥25% eGFR drop with stage advancement), and kidney failure (eGFR <15 mL/min/1.73m²). Competing risk analysis accounted for mortality during median 7-year follow-up.

Results

Five-year survival decreased with worsening baseline kidney function: 86.1% in stages G1–2, 70.6% in stage G3a, 61.3% in stage G3b, 45.4% in stage G4, and 51.9% in stage G5. Cumulative 5-year incidence among CKD patients was 38.7% for rapid progression, 24.0% for CKD stage progression, and 5.5% for kidney failure. Notably, 43% of rapid progressions, 39% of CKD progressions, and 27% of kidney failure events occurred within the first year post-discharge. Males aged ≤70 years with stage G4 CKD and postoperative acute kidney injury had highest risk of all outcomes.

Conclusion

Cardiac surgery patients with preexisting CKD face substantial kidney disease progression risks, particularly early after discharge. These results highlight the need for structured follow-up and early kidney-protective interventions.

Surgical versus Percutaneous Revascularization for Isolated Proximal Left Anterior Descending Artery Disease

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Background

Isolated disease of the proximal left anterior descending (LAD) artery is a critical condition associated with a substantial risk of adverse outcomes. Revascularization with either coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI) is generally considered equivalent in terms of risk of death, myocardial infarction, and stroke, but a higher risk of repeat revascularization following PCI has been reported in previously. We compared the hazard of mortality and repeat revascularization between CABG and PCI in patients with isolated proximal LAD disease.

Materials and Methods

Elective patients who underwent either isolated CABG of the LAD or isolated PCI of segment 6, from 1 January 2012 to 30 June 2023 in Western Denmark were identified by NCSP codes in the Western Denmark Heart Registry. Patients were followed from intervention date to outcome (all-cause mortality, repeat revascularization) or end of study.

Results

Among 6,084 patients with isolated proximal LAD disease, 632 (10.3%) underwent CABG and 5,452 (89.6%) underwent PCI. Median follow-up (IQR) was 4.8 (2.3-7.5) years. PCI patients had a significantly higher hazard of all-cause mortality compared to CABG patients (HR [95% CI] adjusted for age and sex: 1.6 [1.3-2.0], p<0.001). The hazard of any repeat revascularization was similar between groups, but target vessel repeat revascularization was significantly higher after PCI (adjusted HR [95% CI]: 2.1 [1.2-3.8], p=0.013).

Conclusion

CABG was associated with significantly lower mortality and hazard of repeat revascularization on the LAD compared to PCI.

Survival after aortic valve surgery for prosthetic valve endocarditis: a SWEDEHEART study

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Background:An increasing number of people worldwide are living with aortic prosthetic valves and approximately 7% of them will develop prosthetic valve endocarditis (PVE) – a serious and life-threatening complication following any valve replacement. Cardiac surgery is needed in up to 70% of aortic PVE patients, yet data on clinical outcomes after PVE surgery are mainly based on single-center cohorts or limited follow-up. We aimed to examine long-term outcomes after aortic valve surgery for PVE.

Methods:All patients receiving aortic valve surgery for endocarditis in Sweden, 1997-2022, were included. Data was sourced from SWEDEHEART and other national health registries. Flexible parametric models were used to analyze all-cause mortality, heart failure hospitalization, and recurrent endocarditis.

Results:Among 2102 patients, 544 (26%) had PVE and 1558 (74%) had native valve endocarditis (NVE). PVE patients were older (69 vs 61 years) and notably sicker than NVE patients. During a median follow-up time of 5 years (maximum 26), 40% of PVE and 39% of NVE patients died. Cumulative incidence of all-cause mortality at 1, 5, and 10 years was 19%, 33%, and 50% among PVE patients and 12%, 25%, and 40% among NVE patients. At 10 years, estimated survival difference was -8.1% for PVE patients (95% CI: -13.3 to -3.0; Figure 1). We found no statistically significant difference in heart failure or recurrent endocarditis.

Conclusion:PVE patients had worse long-term mortality, but similar incidence of heart failure and recurrent endocarditis. These results reinforce the need for close monitoring of patients undergoing surgery for PVE.

100%
75%
50%
25%
0%
0
5
10
15
20
Time (years)
Native valve IE
Prosthetic valve IE
0%
−5%
−10%
0
5
10
15
20
Time (years)