ISHLT July 2024 | Nursing and Allied Health
JOURNAL WATCH

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Influence of socioeconomic status on rates of advanced heart failure therapies

Larsson, J, et al. *J Heart Lung Transplant* Feb 2024 |https://doi.org/10.1016/j.healun.2024.02.1452

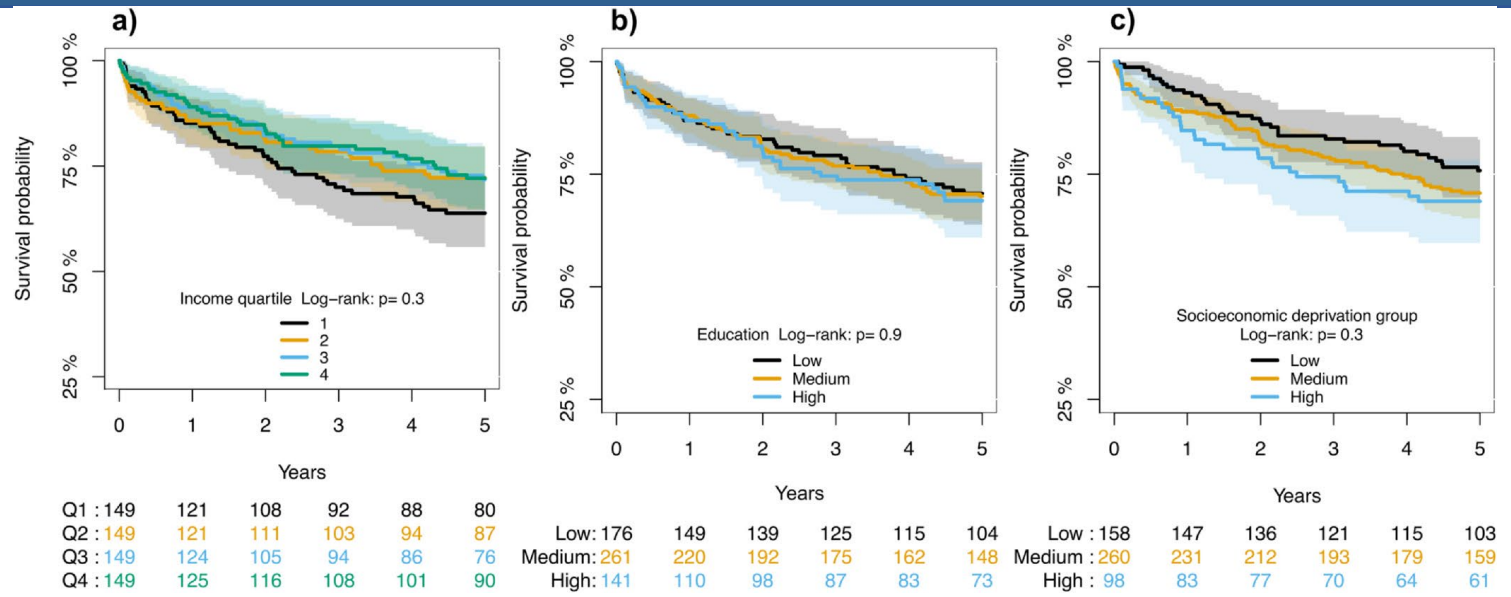
Study Highlights

Background: Socioeconomic deprivation is associated with a lower likelihood of referral for advanced heart failure (HF) evaluation, but it is not known whether it influences rates of advanced HF therapies independently of key hemodynamic measures and comorbidity following advanced HF evaluation in a universal healthcare system.

Methods: Data was obtained from a single-centre Danish clinical registry of patients evaluated for advanced HF. Patients were divided into groups based on the level of education (low, medium, and high), combined degree of socioeconomic deprivation (low, medium, and high), and household income quartiles. Rates of the combined outcome of left ventricular assist device implantation or heart transplantation with death as a competing risk were estimated with cumulative incidence functions.

Results: 629 patients, 77% were men. During a median follow-up of 5 years, 179 (28%) underwent advanced HF therapy. The highest level of education was associated with higher rates (high vs low, adjusted HR 1.81 95% CI 1.14–2.89, $p = 0.01$), whereas household income quartile groups (Q4 vs Q1, adjusted HR 1.37 95% CI 0.76–2.47, $p = 0.30$) or groups of combined socioeconomic deprivation (high vs low degree of deprivation, adjusted HR 0.86 95% CI 0.50–1.46, p = 0.56) were not significantly associated with rates of advanced HF therapy.

Conclusions: Patients with a lower level of education may be disfavoured for advanced HF therapies and could require specific attention in the advanced HF care centre. Despite this, the study demonstrated comparative outcomes regardless of level of education.



Q1 : 149	121	108	92	88	80
Q2 : 149	121	111	103	94	87
Q3 : 149	124	105	94	86	76
Q4 : 149	125	116	108	101	90

Low: 176	149	139	125	115	104
Medium: 261	220	192	175	162	148
High: 141	110	98	87	83	73

Low : 158	147	136	121	115	103
Medium : 260	231	212	193	179	159
High : 98	83	77	70	64	61

Kaplan-Meier analysis of the survival probability by (a) household income quartile, (b) level of education, and (c) socioeconomic deprivation group.

Reviewer's Comments

- Those with the lowest income had higher NHYA functional class III-IV. This suggests further work could be done to target this population at an earlier stage to improve symptom control and refer for advanced therapies.
- Referring clinician opinion appeared to favor well educated patients for having a better perceived ability to cope with advanced therapies. This included potential bias for those smoking and/or living alone. Tertiary centre discussion/education may help dispel these myths.

Limitations

- The single centre Danish data may not be representative of the patient population or referral activity in other countries.
- There was no comment of level of input from transplant coordinators, social work or psychology. This would have provided further insight into whether additional support for those from deprived backgrounds affected long term outcome and survival.

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Mechanical Characterization of Anchoring Devices for the Prevention of Driveline Infection in Left Ventricular Assist Device Patients

Schachl et al, ASAIO Journal, 2024. https://doi.org/10.1097/MAT.0000000000002111

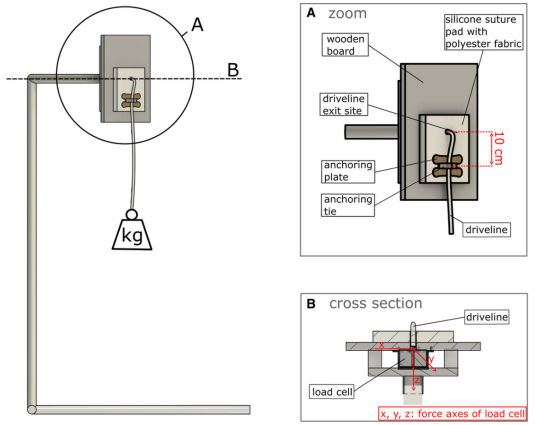
Study Highlights

Objective: Trauma to the driveline exit site (DLES) is a significant risk factor for driveline infections (DLI) for patients with a Left Ventricular Assist Device (LVAD). Use of an anchoring device is an ISHLT recommendation to prevent DL trauma. Using in vitro modelling, the authors tested commonly used adhesive anchoring devices to test their effectiveness in immobilizing the driveline.

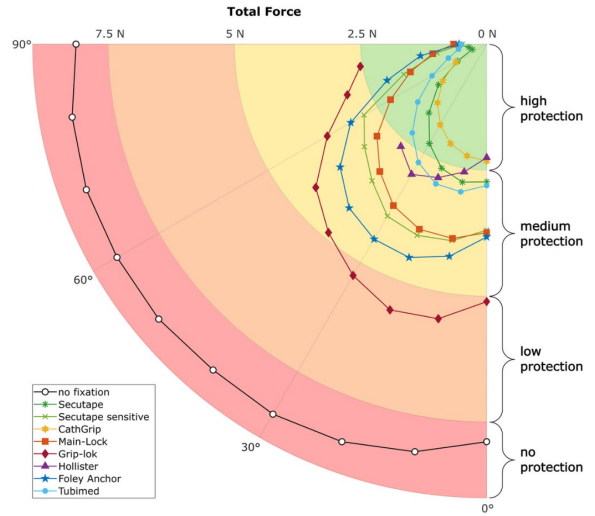
Methods: The most commonly used anchoring devices were identified following literature review and consultation with 9 international LVAD centers. Eight anchoring devices were tested on an in vitro abdominal model of the DLES, where a tensile force (10N) was applied to a HeartMate 3 DL. The resulting mean force (F_{Total}) on the DLES was measured and recorded using a load cell. The anchoring devices were tested at different angles (0 – 90 degrees). The F total for each angle on each device was plotted and classified into four force categories of protection: high (0-25%), medium (25-50%), low (50-75%), and none (75-100%).

Results: Four devices (CathGrip: F_{Total} = 2.1±0.4N, Secutape: F_{Total} = 2.6±0.3N, Hollister: F_{Total} = 2.7±0.5N, Tubimed: F_{Total} = 2.9±0.2N) were significantly ($p < 0.05$) better at preventing tensile forces at the DLES compared to the other four devices (Main-Lock: F_{Total} = 3.7 [0.7] N, Secutape sensitive: F_{Total} = 3.9±0.4N, Foley Anchor: F_{Total} = 4.3±0.5N, Grip-Lok: F_{Total} = 5.4±0.8N). Immobilization of the DL with each anchoring device resulted in lower tensile force on the DLES than without an anchor (F_{Total} = 8.2±0.3N).

Conclusions: The appropriate selection and positioning of DL anchoring devices plays a critical role in reducing the risk of DLI. The CathGrip, Secutape, Hollister, or Tubimed were superior in preventing trauma to the DLES in this study.



Legend: In vitro model set up for tensile force measurement. A: Zoom of abdomen model. B: Cross section of model



Legend: Mean tensile force to the DLES 0° to 90° plot per the anchoring device tested x the level of protection category

Reviewer's Comments

- The HeartMate 3 (HM3) LVAD driveline may be more prone to DL trauma and subsequent DLI due to its large diameter, high stiffness and low flexibility, especially with the addition of the modular cable connection compared to previous generation pumps.
- The article provides a valid insight. Research with a specific focus on improving DL care for HM3 patients is crucial in providing scientific evidence to implement best practice. Evidence overall is universally lacking.
- Anchoring devices with the highest total tensile forces performed better at 90° than superior anchoring devices with the highest protection at 0°. This demonstrates that positioning of the anchor may be more important than product selection itself.

Limitations

- In vitro modelling will not completely replicate daily activities and patient demands on the DL.
- The authors highlighted 4 main limitations:

1. The integrity of human skin and its effects on adhesive properties are not factored in.
2. The abdominal model allows for control of DL exit angle (90°), which is not reflective of how DL usually exits patient's bodies (42°).
3. Not all anchoring devices used in practice may have been identified.
4. Clinical correlation through randomized clinical trial is needed.

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Clinical outcomes among cardiogenic shock patients supported with high-capacity Impella axial flow pumps: A report from the Cardiogenic Shock Working Group

Fried et al. J Heart Lung Transplant. 2024 | DOI: 10.1016/j.healun.2024.05.015

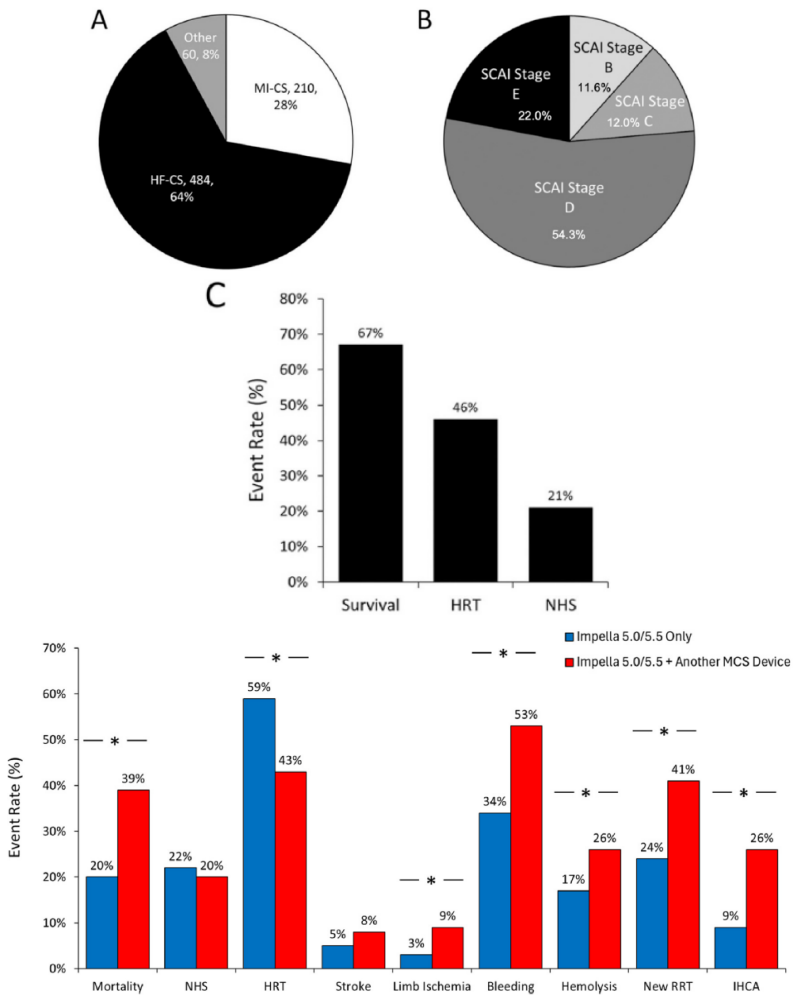
Study Highlights

Objective: To describe real-world data on the indications, usage rates, and clinical outcomes of Impella 5.0 and 5.5 micro-axial assist devices (Abiomed, Danvers, MA) used in cardiogenic shock (CS) patients, either alone or in combination with other temporary mechanical circulatory support (tMCS) devices.

Methods: Retrospective multi-center analysis of the CS Working Group (CSWG) Registry of patients treated with Impella 5.0/5.5 (between 2020-2023 in 34 US hospitals) with or without additional tMCS, focusing on duration of support, adverse events, and discharge outcomes. For survivors, the rates of native heart recovery (NHR) or heart replacement therapy (HRT), including heart transplant (HT) or durable ventricular assist device (VAD) reported. Outcomes were also analyzed based on shock etiology (acute myocardial infarction or MI-CS vs. heart failure-related CS or HF-CS).

Results: Among 6,205 patients, 12.1% received an Impella 5.0/5.5, including 27.8% with MI-CS, and 64.1% HF-CS. 32% Impella 5.0/5.5 as sole tMCS and 68% received a combination of tMCS. Survival to hospital discharge was 67% with Impella 5.0/5.5, 20.4% achieving NHR and 45.5% undergoing HRT. MI-CS patients had higher in-hospital mortality (45.2% vs. 26.2%, $p < 0.001$) and were less likely to receive HRT (22.4% vs. 56.6%, $p < 0.001$) compared to HF-CS patients. Patients receiving a combination of tMCS devices experienced higher rates of limb ischemia (9% vs. 3%, $p < 0.01$), bleeding (52% vs. 33%, $p < 0.01$), and mortality (38% vs. 25%; $p < 0.001$) compared with only Impella 5.0/5.5.

Conclusions: Impella 5.0/5.5 use was associated with 67.1% survival and high rates of HRT. Adverse event rates were lower for sole Impella 5.0/5.5 support, but further research is needed to evaluate whether early use of the Impella 5.0/5.5 improves survival in CS patients.



Legend: Clinical characteristics (A, B) and outcomes (C) stratified by Impella 5.0/5.5 only vs. Impella 5.0/5.5 + another tMCS (D)

Reviewer's Comments

- The main clinical finding of this study was that the majority of patients supported with Impella 5.0/5.5 had additional tMCS use during their hospitalization, but this was related with more adverse events compared to patients who had Impella 5.0/5.5 alone.
- The use of Impella 5.0/5.5 can provide sufficient hemodynamic support as well as allowing for longer duration with sufficient mobility/rehabilitation- until NHR or HRT - that allow maximal life-prolongation.

Limitations

- Retrospective analysis with missing data (registry).
- Observational, multicenter registry does not prescribe a specific treatment algorithm for CS or selection of tMCS devices → thus heterogeneity of treatment approach, patient selection and center experience.
- The extent to which Impella 5.0/ 5.5 is used as a bridge to HRT in varying degrees of shock is not uniform among all.
- Combination of Impella 5.0 and 5.5 in the majority of analysis → although early studies suggest superiority of the Impella 5.0.