

What's New in MCS

March 2014



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Articles:

ASAIO Journal (March/April 2014 Issue):

Thrombus Formation Patterns in the HeartMate II Ventricular Assist Device: Clinical Observations Can Be Predicted by Numerical Simulations

Chiu, Wei-Che; Slepian, Marvin J.; Bluestein, Danny

ASAIO Journal. 60(2):237-240, March/April 2014.

Ventricular Assist Device Thrombosis Following Recovery of Left Ventricular Function

Sifain, Andrew R.; Schwarz, Karl Q.; Hallinan, William; More

ASAIO Journal. 60(2):243-245, March/April 2014.

**De Novo Aortic Insufficiency During Long-Term Support on a Left Ventricular Assist Device: A Systematic Review and Meta-Analysis

Deo, Salil V.; Sharma, Vikas; Cho, Yang Hyun; More

ASAIO Journal. 60(2):183-188, March/April 2014.

*Outcomes and Predictors of Early Mortality After Continuous-Flow Left Ventricular Assist Device Implantation as a Bridge to Transplantation

Sabashnikov, Anton; Mohite, Prashant N.; Zych, Bartlomiej; More

ASAIO Journal. 60(2):162-169, March/April 2014.

End-Organ Recovery Is Key to Success for Extracorporeal Membrane Oxygenation as a Bridge to Implantable Left Ventricular Assist Device

Durinka, Joel B.; Bogar, Linda J.; Hirose, Hitoshi; More

ASAIO Journal. 60(2):189-192, March/April 2014.

Early Feasibility Testing and Engineering Development of the Transapical Approach for the HeartWare MVAD Ventricular Assist System

Tamez, Daniel; LaRose, Jeffrey A.; Shambaugh, Charles; More

ASAIO Journal. 60(2):170-177, March/April 2014.

Noninvasive Arterial Blood Pressure Waveforms in Patients with Continuous-Flow Left Ventricular Assist Devices

Martina, Jerson R.; Westerhof, Berend E.; de Jonge, Nicolaas; More

ASAIO Journal. 60(2):154-161, March/April 2014.

Anticoagulation Therapy Trends in Children Supported by Ventricular Assist Devices: A Multi-Institutional Study

Moffett, Brady S.; Cabrera, Antonio G.; Teruya, Jun; More

ASAIO Journal. 60(2):211-215, March/April 2014.

Implantation of the HeartMate II and HeartWare Left Ventricular Assist Devices in Patients With Duchenne Muscular Dystrophy: Lessons Learned From the First Applications

Ryan, Thomas D.; Jefferies, John L.; Sawnani, Hemant; More

ASAIO Journal. 60(2):246-248, March/April 2014.

A Mock Circulatory System to Assess the Performance of Continuous-Flow Left Ventricular Assist Devices (LVADs): Does Axial Flow Unload Better Than Centrifugal LVAD?

Sénage, Thomas; Février, Dorothée; Michel, Magali; More
ASAIO Journal. 60(2):140-147, March/April 2014.

Elevation of Procalcitonin After Implantation of an Interventional Lung Assist Device in Critically Ill Patients

Kott, Matthias; Bewig, Burkhard; Zick, Günther; More
ASAIO Journal. 60(2):249-253, March/April 2014.

Pharmacist-Managed International Normalized Ratio Patient Self-Testing Is Associated with Increased Time in Therapeutic Range in Patients with Left Ventricular Assist Devices at an...

Bishop, Martin A.; Streiff, Michael B.; Ensor, Christopher R.; More
ASAIO Journal. 60(2):193-198, March/April 2014.

Sex-Specific Outcomes in Patients Receiving Continuous-Flow Left Ventricular Devices as a Bridge to Transplantation or Destination Therapy

Tsiouris, Athanasios; Morgan, Jeffrey A.; Nemeh, Hassan W.; More
ASAIO Journal. 60(2):199-206, March/April 2014.

Do Not Touch the Sternum—Thoracotomy Incisions for HVAD Implantation

Deuse, Tobias; Reichenspurner, Hermann
ASAIO Journal. 60(2):234-236, March/April 2014.

Do Axial-Flow LVADs Unload Better than Centrifugal-Flow LVADs?

Giridharan, Guruprasad A.; Koenig, Steven C.; Slaughter, Mark S.
ASAIO Journal. 60(2):137-139, March/April 2014.

Acquired von Willebrand Disease During CentriMag Support Is Associated with High Prevalence of Bleeding During Support and After Transition to Heart Replacement Therapy

Morrison, Kerry A.; Jorde, Ulrich P.; Garan, Arthur R.; More
ASAIO Journal. 60(2):241-242, March/April 2014.

Home Discharge and Out-of-Hospital Follow-Up of Total Artificial Heart Patients Supported by a Portable Driver System

El Banayosy, Aly; Kizner, Lukacz; Arusoglu, Latif; More
ASAIO Journal. 60(2):148-153, March/April 2014.

Journal of Thoracic and Cardiovascular Surgery (March 2014 Issue):

Safety and efficacy of prothrombin complex concentrates for the treatment of coagulopathy after cardiac surgery

The Journal of Thoracic and Cardiovascular Surgery, Volume 147, Issue 3, March 2014, Pages 1036-1040

Journal of the American College of Cardiology:

**Pre-Operative Risk Factors of Bleeding and Stroke During Left Ventricular Assist Device Support: An Analysis of More Than 900 HeartMate II Outpatients

Journal of the American College of Cardiology, Volume 63, Issue 9, 11 March 2014, Pages 880-888

Circulation: Heart Failure:

Prevalence, Significance, and Management of Aortic Insufficiency in Continuous Flow Left Ventricular Assist Device Recipients

Ulrich P. Jord

Circ Heart Fail. 2014;7:310-319, published online before print January 10 2014, doi:10.1161/CIRCHEARTFAILURE.113.000878

Outcomes of Patients With Peripartum Cardiomyopathy Who Received Mechanical Circulatory Support: Data From the Interagency Registry for Mechanically Assisted Circulatory Support

Journal of Cardiac Failure:

Survival in Elderly Patients Supported With Continuous Flow Left Ventricular Assist Device as Bridge to Transplantation or Destination Therapy

Journal of Cardiac Failure, Volume 20, Issue 3, March 2014, Pages 161-167

Reviews:

****De Novo Aortic Insufficiency During Long-Term Support on a Left Ventricular Assist Device: A Systematic Review and Meta-Analysis**

Deo, Salil V.; Sharma, Vikas; Cho, Yang Hyun; More
ASAIO Journal. 60(2):183-188, March/April 2014.

Aortic insufficiency (AI) may occur while supported on a left ventricular assist device (LVAD). The Mayo group conducted a systematic review to determine the incidence, predictors, and consequences of AI during LVAD support.

This study included a MEDLINE search for original studies presenting clinical data regarding patients who developed AI during LVAD implant. Seven observational studies (657 patients) were selected for review. The incidence of AI was 25% (11-42%) (Support period: 412 ± 281 days). AI increased by 4% (1-6%) per month of support ($p < 0.01$). AI-positive patients were older at implant (weighted mean difference, 7.7 [4.3; 11.1]; $p < 0.01$). Female sex (0.002 ± 0.001 ; $p = 0.01$) and smaller body surface area (-0.003 ± 0.001 per m; $p < 0.01$) correlated with progressive AI. Destination therapy patients (odds ratio [OR], 5.3 [1.2, 24]; $p = 0.02$) and those with Cf-LVAD pumps were likely to develop AI (hazard ratio [HR], 2.2 [1.2, 3.8]; $p < 0.01$). A closed aortic valve was associated with AI (OR, 4.7 [1.9, 11.8]; $p < 0.01$). Survival was comparable in both cohorts (HR, 1.5 [0.81, 2.8]; $p = 0.2$). A significant number of patients develop de novo AI during LVAD support. Advanced age, longer support duration, continuous-flow pumps, and a closed aortic valve are associated with AI.

Analysis:

This study represents a large and systematic review of the incidence, importance, and predicting factors of AI development after LVAD implantation. Several controversies and misconceptions exist when evaluating the importance of AI for patients undergoing LVAD implantation. This study reaffirms the need to careful assessment of AI during implant and emphasizes patient and clinical factors to consider when making a decision to address AI. With the increased importance of destination therapy, further detailed studies regarding this specific aspect will be crucial to develop appropriate and clear guidelines for this complex patient population.

****Pre-Operative Risk Factors of Bleeding and Stroke During Left Ventricular Assist Device Support: An Analysis of More Than 900 HeartMate II Outpatients**

Journal of the American College of Cardiology, Volume 63, Issue 9, 11 March 2014, Pages 880-888

This study sought to determine the pre-operative risk factors related to late bleeding, stroke, and pump thrombosis in patients with HeartMate II (HMII) left ventricular assist devices (LVADs). From the HMII Investigators, this study represents a large cohort of patients and addresses an important topic.

This was a retrospective analysis of prospectively collected data. A total of 956 patients with advanced heart failure discharged from the hospital were analyzed. Authors sought to evaluate preoperative risk factors for bleeding and stroke in the outpatient setting.

Main findings are that adverse event rates for post-discharge bleeding (0.67 events/patient-year) were higher than those for hemorrhagic stroke (0.05), ischemic stroke (0.04), and pump thrombosis (0.03).

Older age (>65 years) (hazard ratio [HR]: 1.31), lower pre-operative hematocrit ($\leq 31\%$) (HR: 1.31), ischemic etiology (HR: 1.35), and female (HR: 1.45) were statistically significant multivariable risk factors for bleeding. Female (HR: 1.92) and 65 years of age and younger (HR: 1.94) were multivariable risk factors for hemorrhagic stroke, whereas female (HR: 1.84) and history of diabetes (HR: 1.99) were risk factors for ischemic stroke. Female (HR: 1.90) and higher body mass index (HR: 1.71/10 kg/m² increase) were also multivariable risk factors for pump thrombosis.

Analysis

This study is important as it relates to a large number of patients. Understanding clinical factors involved in stroke and bleeding is critical for the progress of our field. Despite its lack of granularity, this study starts to identify preoperative factors associated with common adverse events, and how it relates to patient and disease conditions. Further studies with large collaborative cohort outside of published pivotal trials are however needed to truly understand conditions, but most importantly, post discharge factors (hypertension, anticoagulation, pump speed, etc) that are truly important for adverse pump-related events.

Disclosure statement: the author is a consultant for Heartware and Thoratec, but does not have any associations or relationship with industry that might pose a conflict of interest with this submitted work.