TAVR and Beyond – What is New in Structural Heart Interventions at Cox Health

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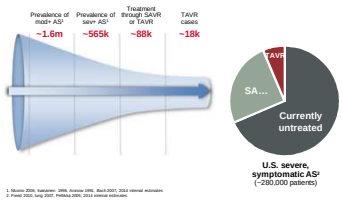
Agenda

1. **Aortic Stenosis and Treatment**
2. Left Atrial Appendage Occlusion with Watchman for stroke prevention in atrial fibrillation with contraindication to long term anticoagulation
3. Transcatheter Mitral Valve Repair with Mitraclip

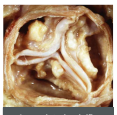
High number of US patients with severe aortic stenosis remain largely undertreated



1. Nkomo 2006; Iwakami 1999; Aronow 1991; Bach 2007; 2014 interval estimates
2. Freed 2010; Iung 2007; Pellikka 2005; 2014 interval estimates

Symptoms of aortic stenosis

- Shortness of breath
- Syncope or presyncope
- Angina
- Fatigue
- Difficulty when exercising
- Swollen ankles and feet
- Rapid or irregular heartbeat
- Palpitations (an uncomfortable awareness of heart beating rapidly or irregularly)

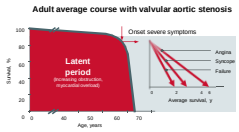


Age-related calcific aortic stenosis

The **symptoms of aortic disease are commonly misunderstood by patients as 'normal' signs of aging.**[3] Many patients initially appear asymptomatic, but **on closer examination up to 37% exhibit symptoms.**[4]

3. Otto P. Europace Heart Journal. 2005;26:1309-1313.
4. Lerakis S.Int at. CHEST 1998;113(3):1109-1114.

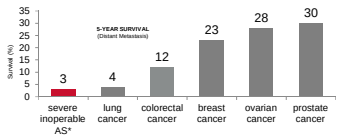
Severe aortic stenosis is life threatening and treatment is critical[5]



After the onset of symptoms, patients with **severe aortic stenosis** have a **survival rate as low as 50% at 2 years and 20% at 5 years** without aortic valve replacement

5. Otto CM. Timing of aortic valve surgery. Heart. 2000;84:211-218

Severe aortic stenosis has a worse prognosis than many metastatic cancers

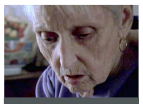


5-year survival of breast cancer, lung cancer, prostate cancer, ovarian cancer and severe inoperable aortic stenosis

*Using contact hazard ratio. Data on file. Edwards Lifesciences LLC. Analysis courtesy of Mandi Tucca, MD, Cleveland Clinic

Timely intervention is critical for patients with symptoms[6]

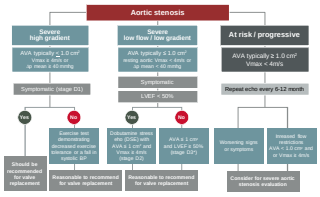
- In the absence of serious comorbid conditions indicated in the majority of symptomatic patients with severe aortic stenosis
- Consultation with or referral to a Heart Valve Center is reasonable when discussing treatment options for:
  - Asymptomatic patients with severe valvular heart disease
  - Patients with multiple comorbidities for whom valve intervention is considered
- Because of the risk of sudden death, replacing the aortic valve should be performed promptly after the onset of symptoms
- Age is not a contraindication to surgery



Sandy
severe aortic stenosis
(actual patient)

6. Nishimura RA et al. JACC. 2014. doi: 10.1016/j.jacc.2014.02.537.

AHA/ACC guidelines for aortic valve replacement in patients with aortic stenosis



*AVR should be considered with stage D3 AS only if valve obstruction is the most likely cause of symptoms, stroke-volume index is < 35 mL/m², indexed AVA is ≤ 0.6 cm²/m² and data are recorded when the patient is normotensive (systolic BP< 140 mm Hg).

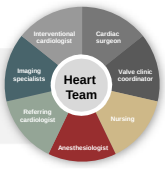
The specialized Heart Team

Cohesive, multi-disciplinary approach embodies

- Optimal patient centric care
- Dedication across medical specialties
- Collaborative treatment decision

National coverage determination[9]

The patient (preoperatively and postoperatively) is under the care of a Heart Team

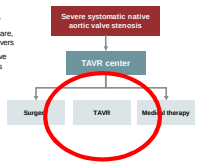


9. National coverage determination (NCD) for transcatheter aortic valve replacement (TAVR). 2012.

Devising the treatment plan is a collaborative process

A Heart Team will conduct a comprehensive evaluation to determine whether the TAVR procedure is appropriate

- Obtain information required to make a recommendation for the best plan of care
- All treatment options, including hospice care, are discussed with the patient and caregivers
- Ultimate treatment choice is a collaborative decision between the physicians, patients and patient's family



Alain Cribier: First human transcatheter valve replacement (2002)

First CoreValve Implants
Laborde, Lal, Grube | 2004

1st Clinical Implants Initiated in Summer 2004
Patient N°19 in TAVI History

[1] Laborde, presented at Sao Paulo May 6th, 2019

Landmark Clinical Trials

Extreme Risk

Foundational trials tested new TAVI therapy in patients without the option for a surgical aortic valve replacement

US CoreValve Pivotal Trial

CoreValve, N=489, STS 10.3%

Transcatheter Aortic Valve Replacement Using a Self-Expanding Bioprosthesis in Patients With Severe Aortic Stenosis at Extreme Risk for Surgery

PARTNER 1B

SAPIEN, N=179, STS 11.2%

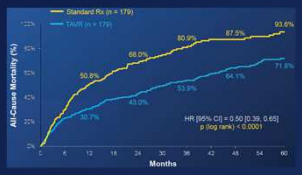
The NEW ENGLAND JOURNAL of MEDICINE

Transcatheter Aortic-Valve Implantation for Aortic Stenosis in Patients Who Cannot Undergo Surgery

Landmark Clinical Trials

Extreme Risk | PARTNER 1B

The PARTNER Extreme Risk Trial showed that by 5 years, patients randomized to TAVI had reduced mortality by over 20% compared to standard treatment



*Kapadia, et al., presented at TCT 2016

Landmark Clinical Trials

Intermediate Risk

Randomized trial data comparing TAVI to SAVR in intermediate surgical risk patients recently became available

SURTAVI and SURTAVI CAS

Surgical or Transcatheter Aortic-Valve Replacement in Intermediate-Risk Patients

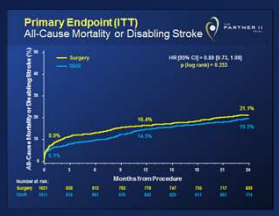
PARTNER 2A and PARTNER S3i

Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients

Landmark Clinical Trials

Intermediate Risk | PARTNER 2A

The PARTNER 2A Trial showed that TAVI with SAPIEN XT was non-inferior to surgery for the primary endpoint of all-cause mortality or disabling stroke at 2 years



[1]Smith, et al., presented at ACC 2016

Landmark Clinical Trials

Low Risk

Recently, both Medtronic and Edwards presented and published results from randomized low risk trials

Primary Results From the Evolut Low Risk Trial

Michael J. Reardon, MD, FACC
Houston Methodist DeBakey Heart & Vascular Institute, Houston, TX
For the Evolut Low Risk Trial Investigators

PARTNER 3

Transcatheter or Surgical Aortic Valve Replacement in Low Risk Patients with Aortic Stenosis

Martin B. Leon, MD &
Michael J. Mack, MD
on behalf of the PARTNER 3 Trial Investigators

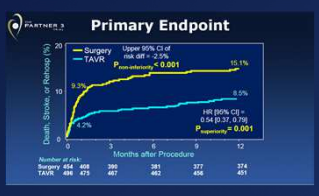
[1]Reardon et al., presented at ACC 2019 [2]Leon et al., presented at ACC 2019[3]Watkins, et al., presented at EuroPCR 2018;

Landmark Clinical Trials

Low Risk | Evolut Low Risk Trial

The PARTNER 3 low risk trial also demonstrated the success of TAVI in low risk patients

TAVI with Sapien 3 demonstrated significantly less death, stroke, or rehospitalization out to 1 year



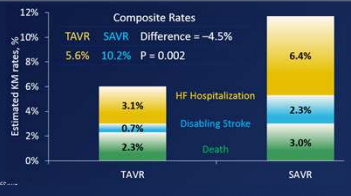
[1]Leon et al., presented at ACC 2019

Landmark Clinical Trials

Low Risk | Evolut Low Risk Trial

The Evolut Low Risk Trial demonstrated success of the Evolut platform in low surgical risk patients with significantly less death, disabling stroke, or HF hospitalization out to 1 year compared to surgery

Additionally, the trial found significantly better hemodynamic results with the Evolut platform compared to surgery



*Reardon et al, presented at ACC ....

The PARTNER 3 Trial

Clinical Implications

- Based upon these findings, TAVR should be considered the preferred therapy in low surgical risk aortic stenosis patients.
- Over the past 12 years, the PARTNER trials clearly indicate that the benefit of TAVR is independent of surgical risk profiles.
- The choice of TAVR vs. surgery in aortic stenosis patients should be a shared-decision making process, respecting patient preferences; every patient should be informed of all treatment options.

Is TAVR for Everyone?

Patient Selection Considerations

With TAVI now proven safe across the risk spectrum, several new factors will drive patient selection

- Valve Durability
- Hemodynamic Performance
- Coronary Access
- Conduction Disturbances and Pacemakers
- Stroke
- Paravalvular Leak
- Leaflet Thrombosis
- Challenging Anatomies (i.e. Bicuspid Aortic Stenosis)
- Treatment of Failed Bioprosthetics

Valve Durability???

AVR Durability

Current Status

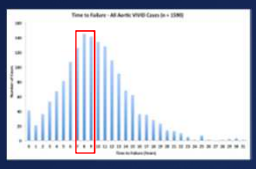
- Surgical aortic valve replacement (SAVR) has been the historical gold standard for treating severe symptomatic aortic stenosis.
- The durability of bioprosthetic valves has been reported, but variation in definitions of valve deterioration, methodology, and follow-up are major limitations in the literature.
- The first transcatheter aortic valve was commercialized in 2007. There are some data on early generation TAV recipients out to ~10 years, but these long-term data come from extreme- or high-risk populations where the competing risk for mortality is high.

SAVR Durability

Reporting by Freedom-from-Reintervention

While studies reporting freedom-from-reoperation may signal valve durability beyond 15 years, data from the VIVID Registry shows that most ViV procedures for failed surgical valves occurs around 8 or 9 years post-SAVR.

Historical surgical literature relying on freedom-from-reoperation to assess valve failure likely underestimates true rates of SVD for surgical valves. Standardized definitions and surveillance going forward will clarify valve deterioration rates in the AVR population.



[1] Coppobono & Wolkonon. Presented at CRT 2019.

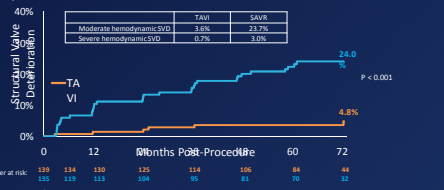
TAVI Durability

Clinical Trial | NOTION Low Risk 6-Year Results

ESC/EACTS/EAPCI definition Structural Valve Deterioration

Randomized clinical trial data with the longest SVD follow-up comes from the NOTION Trial, which studied TAVI vs. SAVR in low-risk patients >70 years, implanted with a self-expanding TAV. Using the ESC/EACTS/EAPCI definition, SVD occurred in 4.8% of TAVI patients and 24.0% of SAVR.

	TAVI	SAVR
Moderate hemodynamic SVD	3.6%	23.7%
Severe hemodynamic SVD	0.7%	3.0%



[1] Søndergaard, et al. JACC 2019;73(1):546–53. [2] Coppobono et al., Eur J Cardiothorac Surg. 2017; 52 808-817

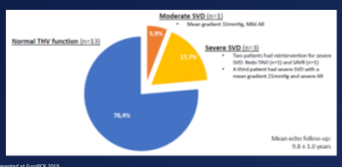
TAVI Durability

Real World Experience| Vancouver Data at 8 Years

ESC/EACTS/EAPCI definition Structural Valve Deterioration

The longest non-randomized data available on balloon-expanding valves are 8-year results from the prospective Vancouver study.

- This study did not use the ESC/EACTS/EAPCI definitions, since they were published after the analysis.
- Freedom from valve degeneration was approx. 80% at 6 years.



Satharanthan. Presented at EuroPCR 2019.

Durability
Key Takeaways

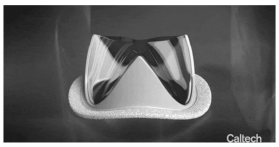
- Historically, AVR durability has been measured by rate of reoperation, which can mask de facto valve deterioration in cases where re-do AVR is postponed or unfeasible.
- Data on surgical valve SVD is limited. Recent data from the VIVID registry estimate a median time-to-reintervention of 9 years.
- In an all-comers population, self-expanding valves yielded lower rates of cumulative hemodynamic SVD compared to SAVR out to 6 years.
- Age at implant is an important risk factors for SVD.
- Clinical trials in intermediate- and low-risk patients will follow patients out to 10 years and provide much needed information on TAVR valve durability.

[a]Sondergaard, et al. JACC 2019;74(10):146–53, [b]Vollenbroich et al. Int J Cardiol 2019, [c]Blackman et al. JACC 2019;73:537–45, [d]Eider et al. Circulation. 2018;138:2987–2607, [e]Deutsch et al., EuroIntervention. 2018;14:81–9, [f]Vilsma et al. JAMA Cardiol 2018;3:71–80, [g]Umo et al., J Card Surg. 2014 Jul;29(4):439–44, [h]Vanwig, et al. Circulation. 2010;121:2123–2

SEPTEMBER 18, 2019

New polymer heart valve implanted in first patient

by Robert Perkins, California Institute of Technology



Credit: California Institute of Technology

Source: https://medicalxpress.com/news/2019-09-polymer-heart-valve-implanted-patient.html

Devising the treatment plan is a collaborative process

A Heart Team will conduct a comprehensive evaluation to determine whether the TAVR procedure is appropriate

- Obtain information required to make a recommendation for the best plan of care
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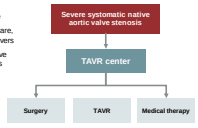
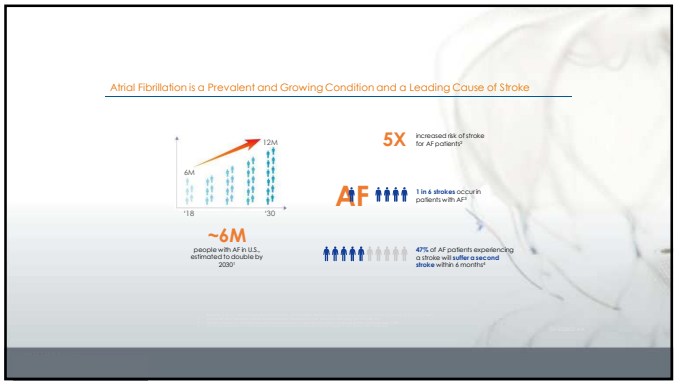
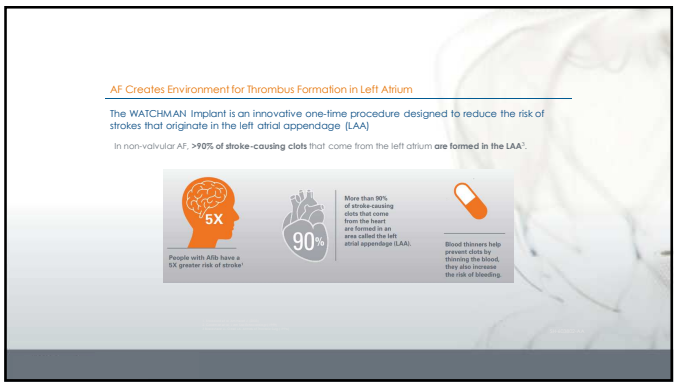


Agenda

1. Aortic Stenosis and Treatment
2. **Left Atrial Appendage Occlusion with Watchman for stroke prevention in atrial fibrillation with contraindication to long term anticoagulation**
3. Transcatheter mitral valve repair with Mitraclip
4. Patent Foramen Ovale (PFO) closure for stroke prevention





Long-Term Oral Anticoagulation is Not Ideal for All NVAF Patients

Warfarin and Direct Oral Anticoagulants come with risk factors for many NVAF patients.

~6M 5X 90%

Patients Struggle with Compliance to Anticoagulation

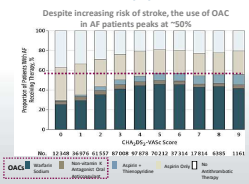
68%

of patients interested in learning more about WATCHMAN **struggle with compliance** while taking OACs[1]

Adherence to Anticoagulation Remains a Challenge

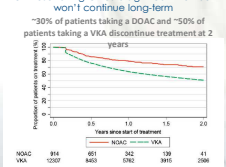
About half of patient with AF are not treated with OAC

Despite increasing risk of stroke, the use of OAC in AF patients peaks at ~50%



Of those taking OACs a significant number won't continue long-term

~30% of patients taking a DOAC and ~50% of patients taking a VKA discontinue treatment at 2 years

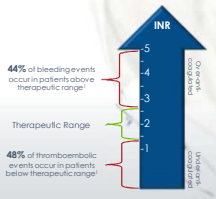


NCDR Pinnacle Registry

Many Patient Struggle to Maintain Therapeutic Range on Warfarin

Many patients spend a significant amount of time outside of the therapeutic range.

Warfarin tops the list for emergency hospitalizations for adverse drug events in older Americans[2].



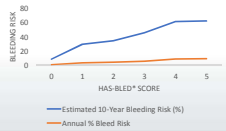
44% of bleeding events occur in patients above therapeutic range[3]

Therapeutic Range

48% of thromboembolic events occur in patients below therapeutic range[3]

Bleeding Risks on Anticoagulants Compound Over Time

The risk of bleeding associated with OACs compounds year over year, while WATCHMAN is a one-time procedure with a low complication rate



CHA$_2$DS$_2$-VASc* Score	Annual % Stroke Risk
0	0
1	1.3
2	2.2
3	3.2
4	4.0
5	6.7

HAS-BLED Score *	Annual % Bleed Risk*	Estimated 10-Year Bleeding Risk (%)*
0	0.9	8.6
1	3.4	29.2
2	4.1	34.2
3	5.8	45.0
4	8.9	60.6
5	9.1	61.5

*Assumes constant risk despite increasing age and bleeding risk is independent from bleeding risk in previous years.

CHA$_2$DS$_2$-VASc score – Congestive heart failure=1, Hypertension (BP >140/90 mm Hg)=1, Age ≥ 75 years=2, Diabetes mellitus=1, Prior stroke, TIA, or thromboembolism=2, Vascular disease (PAD, MI, or Age 65-74 years=1, Sex category (female)=1

HAS-BLED score – Hypertension=1, Abnormal renal/liver function (1pt each)=1 or 2, Hemorrhagic stroke=1, Bleeding history or predisposition=1, Labile INRs=1, Elderly=1, Current drugs (medication) or alcohol use=1 or 2 (each), or 0.

Patients are Looking for an Alternative to Oral Anticoagulants

83%

More than 4 in 5 people with AFib taking an oral anticoagulant (83%) say they would be **willing to try a different treatment** to help reduce their risk of stroke[1]

Over a third of people with AFib (38%) feel trapped between the fear of having a stroke and fear of the risks associated with oral anticoagulants.

National Online Survey conducted of more than 400 people (aged 45 and older) living with AF.

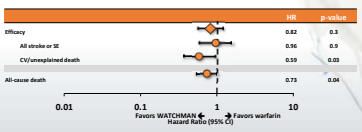
WATCHMAN is a One-Time Procedure that Provides a Lifetime of Stroke Risk Reduction

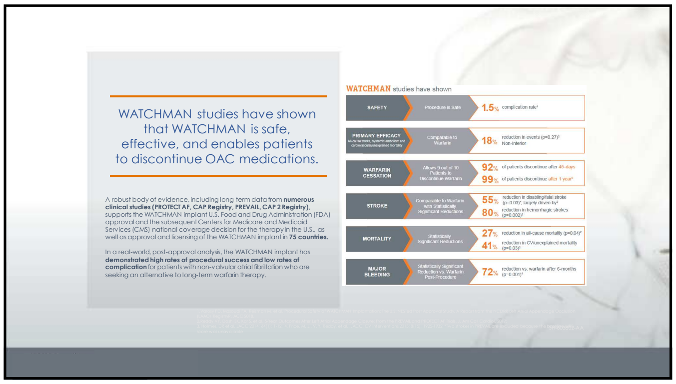
WATCHMAN has Clinically Proven Long-Term Outcomes

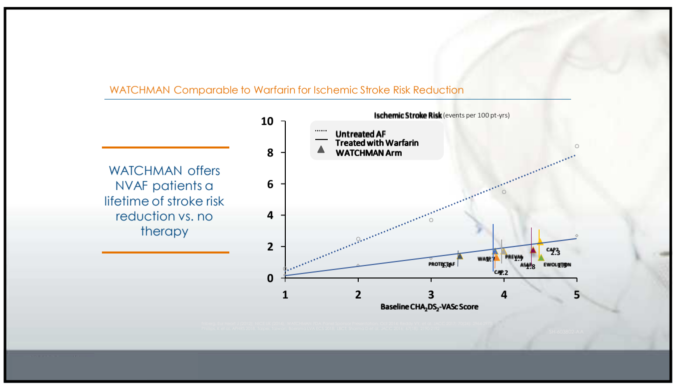
Long-Term Results Demonstrated WATCHMAN Reduced Risk of Stroke, Bleeding and Mortality vs. warfarin

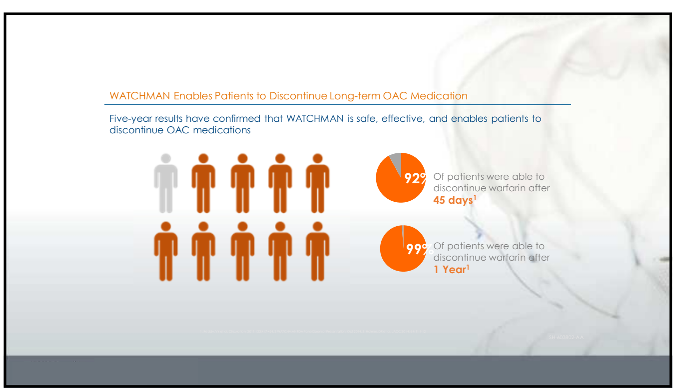
Five-year data from a patient-level meta-analysis of the PROTECT AF and PREVAIL trials demonstrated that WATCHMAN offered:

- Comparable primary efficacy and all-cause stroke reduction




WATCHMAN studies have shown that WATCHMAN is safe, effective, and enables patients to discontinue OAC medications.
A robust body of evidence, including long-term data from numerous clinical studies (PROTECT AF, CAP Registry, PREVAIL, CAP 2 Registry), supports the WATCHMAN implant U.S. Food and Drug Administration (FDA) approval and the subsequent Centers for Medicare and Medicaid Services (CMS) national coverage decision for the therapy in the U.S., as well as approval and licensing of the WATCHMAN implant in 75 countries.
In a real-world, post-approval analysis, the WATCHMAN implant has demonstrated high rates of procedural success and low rates of complication for patients with non-valvular atrial fibrillation who are seeking an alternative to long-term warfarin therapy.
WATCHMAN studies have shown
SAFETY
Procedure is Safe
1.5% complication rate[1]
PRIMARY EFFICACY
All-cause stroke, systemic embolism and cardiovascular/unexplained mortality
Comparable to Warfarin
18% reduction in events (p=0.27)[2] Non-Inferior
WARFARIN CESSATION
Allows 9 out of 10 Patients to Discontinue Warfarin
92% of patients discontinue after 45-days
99% of patients discontinue after 1 year[3]
STROKE
Comparable to Warfarin with Statistically Significant Reductions
55% reduction in disabling/fatal stroke (p=0.03)*, largely driven by[2]
80% reduction in hemorrhagic strokes (p=0.002)[2]
MORTALITY
Statistically Significant Reductions
27% reduction in all-cause mortality (p=0.04)[2]
41% reduction in CV/unexplained mortality (p=0.03)[2]
MAJOR BLEEDING
Statistically Significant Reduction vs. Warfarin Post-Procedure
72% reduction vs. warfarin after 6-months (p=0.001)[4]

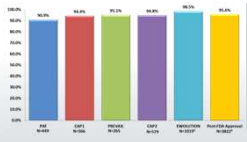

WATCHMAN Comparable to Warfarin for Ischemic Stroke Risk Reduction
WATCHMAN offers NVAF patients a lifetime of stroke risk reduction vs. no therapy
Ischemic Stroke Risk (events per 100 pt-yrs)
Untreated AF
Treated with Warfarin
WATCHMAN Arm
10
8
6
4
2
0
1
2
3
4
5
Baseline CHA2DS2-VASc Score
PROTECT AF
1.4
PREVAIL
1.7
CAP2
2.3
1.8
1.2


WATCHMAN Enables Patients to Discontinue Long-term OAC Medication
Five-year results have confirmed that WATCHMAN is safe, effective, and enables patients to discontinue OAC medications
Of patients were able to discontinue warfarin after 45 days[1]
Of patients were able to discontinue warfarin after 1 Year[1]

WATCHMAN Procedure has Proven Safety

WATCHMAN has a High Procedural Success Rate

WATCHMAN maintains favorable safety outcomes from clinical studies to real-world experience



WATCHMAN is a one-time, minimally invasive procedure with high procedural success and proven safety

95% Procedural Success*

1.5% Major complication rate

*Procedural Success defined as deployment and release of the device into the LAA with no leak greater than or equal to 5mm

WATCHMAN is Suitable for a Broad Range of Patients Seeking an Alternative

Consider WATCHMAN for your Patients that Need an Alternative

Agenda

1. Aortic Stenosis and Treatment
2. Left Atrial Appendage Occlusion with Watchman for stroke prevention in atrial fibrillation with contraindication to long term anticoagulation
3. **Transcatheter mitral valve repair with Mitraclip**

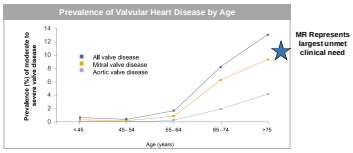
MitraClip®
Transcatheter Mitral Valve Repair

Transcatheter
Mitral Valve Repair

See important safety information referenced within

Mitral Valve Disease is Common and Increases with Age

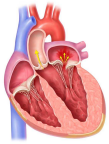
Mitral regurgitation (MR) is the most common type of heart valve insufficiency in the US[1,2] Represents 60% of all Valve Disease



1. Heart Disease and Stroke Statistics 2010 Update: A Report From the American Heart Association. Circulation. 2010;121:e46-e215.
2. Nkomo et al. Burden of Valvular Heart Diseases: A Population-based Study. Lancet, 2006; 368: 1005-11.

Mitral regurgitation is a heart valve disorder with serious clinical consequences

MR occurs when the mitral valve fails to close completely, causing blood flow to move backward.



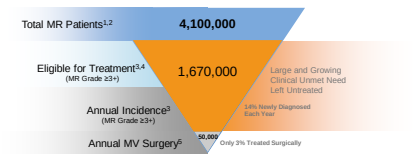
Mayo Clinic (www.mayoclinic.com)

- Untreated MR results in heart failure[1]
- 1-year mortality up to 57%[2]
- 30-day rehospitalization rate 25%-50%[3]

Abbreviation: MR, mitral regurgitation.

1. Cuttis, Griffin. In: Carey WD. *Cleveland Clinic Current Clinical Medicine*. 2nd ed. Philadelphia, PA: Saunders; 2010.
2. Crotti, et al. *Eur J Heart Fail*. 2005;7(7):112-1117.
3. O'Connor, et al. *J Am Coll Cardiol*. 2010;56(5):369-371.

Mitral Regurgitation 2012 U.S. Prevalence
A Largely Untreated Patient Population



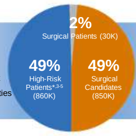
1. US Census Bureau. Statistical Abstract of the US: 2006. Table 12.
2. Nkomo et al. Burden of Valvular Heart Diseases: A Population-based Study. Lancet, 2006; 368: 1005-11.
3. Iung et al. A prospective survey of patients with valvular heart disease in Europe. Eur Heart J. 2003;24:1231-43.
4. ACC/AHA 2008 Guidelines for the Management of Patients with Valvular Heart Disease. Circulation. 2008
5. Gummert, J et al, Trends in Mitral Valve Surgery in the United States: Results from the STS Adult Cardiac Database, Annals of Thoracic Surgery 2009.

Many patients are not considered appropriate candidates for mitral valve surgery

Large portion of mitral regurgitation patients are left untreated—ineligible for surgical treatment or denied surgical intervention[1-2]

Factors prohibiting Surgery include[6]:

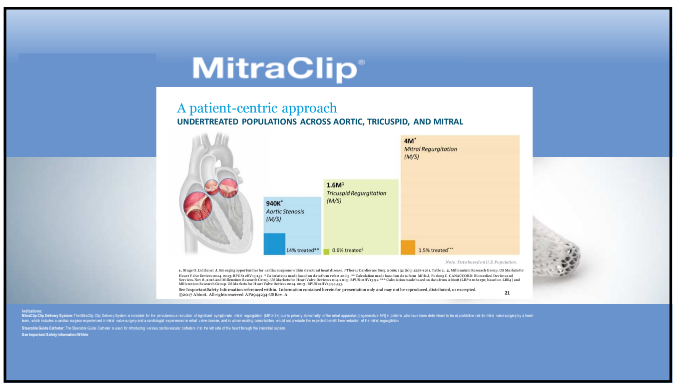
- Impaired LVEF
- High operative risk
- Multiple comorbidities
- Advanced age



Of surgical candidates, up to 50% of patients are not referred to surgery, even if a surgical indication exists [2]

* Note: High-Risk Patients are defined as any patient with an EF<35% or an age of 75+.

1. Lung B, et al. *Eur Heart J.* 2003;24:1231-1243.
2. Mirabel M, et al. *Eur Heart J.* 2007;28:1358-1365.
3. U.S. Census Bureau, Statistical Abstract of the U.S.
4. Nkomo et al. Burden of Valvular Heart Diseases: A Population-based Study, Lancet, 2006; 368: 1005-11.
5. Patel, et al. Mitral Regurgitation in Patients with Advanced Systolic Heart Failure, J of Cardiac Failure, 2004.
6. Rankin, et al, J of Thoracic and Cardiovascular Surgery, March 2006



Overview of Patient Selection.

Functional MR

- Abnormal function of anatomically normal leaflets
- Annular enlargement secondary due to left ventricular dilatation
- Papillary muscle displacement due to left ventricular remodeling may result in excessive tenting of the leaflet

Normal Mitral Valve

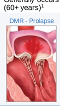
FMR

Now FDA Approved

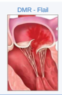
Degenerative MR

- Elongation or rupture of the chordae
- Leaflet tissue expansion and thickening (Barlow's Disease)
- Fibroelastic deficiency resulting in a thinning of leaflet tissue or rupture of chordae
- Generally occurs in the older population (60+ years)[1]

DMR - Prolapse



DMR - Flail



Commercial Therapy

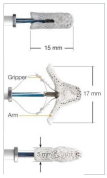
Mitral Regurgitation: An Undertreated Disease

Bach et al. Failure of Guideline Adherence for Intervention in Patients With Severe Mitral Regurgitation. J Am Coll Cardiol 2009;54:893-5.

Conclusions

Among patients with severe organic MR, surgical intervention occurred in approximately one-half eligible patients. **However, accepted guideline indications for intervention were present in the majority patients not operated on.** Objectively assessed operative risk was not prohibitive in many patients not operated on.

A Closer Look at the MitraClip Device



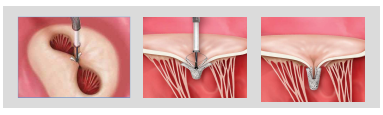
- Design Features
  - Ability to accurately position and reposition
  - Mitral repair without arresting the heart (no need for cardiopulmonary bypass
  - Real time assessment of MR reduction under normal loading conditions.

- MitraClip Device (Implant)
  - Cobalt chromium construction
  - MRI conditional to 3 Tesla[1]
  - Polyester cover designed to promote tissue growth[2]

1. Static magnetic field up to 3 Tesla, maximum spatial gradient in static field of 2900gauss/cm or less, maximum whole-body averaged specific absorption rate (SAR) on 3 Tesla for 15 minutes of scanning.
2. Abbott Vascular Data on File.

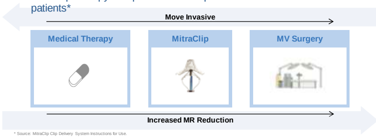
Design Principles & Results

- Establishes vertical coaptation capturing leaflets and drawing them together
- Mitral repair on a beating Heart (no need for cardiopulmonary bypass)
- Repositionable with unique steering for precise placement
- Mitral regurgitation assessed in real time under normal loading conditions allowing repositioning for optimal desired outcome.
- Surgical intervention remains preserved[1]

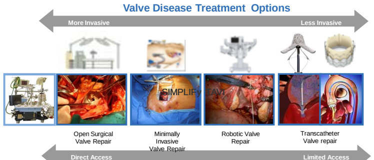


MitraClip Therapy
Filling a Treatment Gap

- Medical therapy is limited to symptom management
- MV surgery has been the only option that reliably reduces MR
- A significant gap exists between medical and surgical options
- MitraClip therapy is a percutaneous option to reduce MR in select patients*



Minimally invasive procedures are driving growth in cardiovascular services



At the end of 2014, percutaneous heart valve procedures represent 26 percent of heart valve procedures compared to 4.6 percent in 2009.[1]

1. Millennium Research Group. 2011. Business Wire website. http://www.businesswire.com/news/home/20110223005295/en/Largest-European-Surgical-Procedure-Growth-Minimally-Invasive#.U_yLp6jD-os. Accessed August 26, 2014.

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