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Erin Camenisch's passion for cardiac health began during her college years when she experienced her father's sudden heart attack. This personal encounter led her to pursue a career in cardiac medicine. After graduating from the Medical University of South Carolina with a degree in cardiac perfusion, Erin spent a decade practicing perfusion, providing critical support to patients undergoing cardiac surgery. She worked in the cardiac industry for the past 15 years on cardiac technology and patient care. At HeartFlow, she continues work in developing cutting-edge technologies for diagnosing and treating heart disease.

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Human Papillomavirus (HPV) and Head & Neck Cancer

By: Christopher Balamucki, MD,
North Florida Radiation Oncology,
ACMS President

The human papillomavirus (HPV) is a double-stranded DNA virus that is considered a sexually transmitted disease (STD). HPV is very small (55 nm, which is smaller than bacteria), with approximately 8000 base pairs (Figure 1). Humans are the only known host for HPV. There are over 100 different strains, of which 30-40 are sexually transmissible. HPV 16 and 18 are considered high-risk, while other strains, such as 6 and 11, are lower-risk (causing genital warts).

HPV is transmitted via skin, mucosa (e.g. inside of mouth), and genital contact. Risk of exposure to the high-risk strains increases with number of sexual partners. HPV incubation period is approximately 3 – 4 months, typically with no signs of infection. Although 80% of the population has been exposed to HPV, most infections (approximately 90%) clear after approximately 2 years and cause no harm. However, the best way to avoid contracted HPV is to get vaccinated early in life. For example, Gardasil 9® is an HPV vaccine that is administered to both males and females from ages 9 to 45 (ideally at 11 – 12 years old), given in 2 – 3 doses, and covers HPV types 6, 11, 16, 18, 31, 33, 45, 52, and 58.

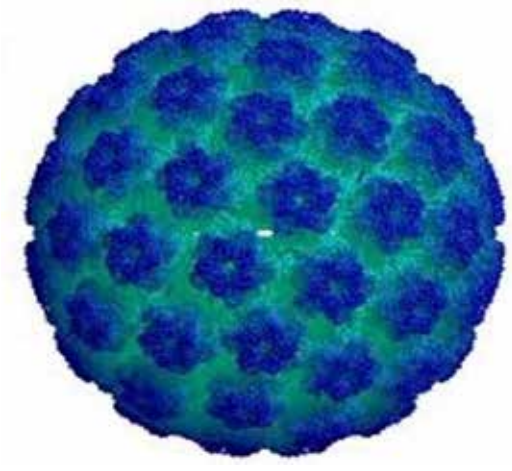

Figure 1: The Human Papillomavirus (HPV)

The high-risk HPV strains can cause cervical, head & neck (mostly oropharyngeal), anal, penile, and vaginal/vulvar cancers. While more than 99% of cervical cancer is caused by high-risk HPV, most of head and neck cancer was historically caused by other factors, such as tobacco use (smoking) and to a lesser extent, alcohol. Over the last 20 years, the oropharynx, a specific region of the head and neck, has experienced a significant rise in HPV-mediated cancers (squamous cell carcinoma). The subsites of the oropharynx include the tonsils (including the anterior tonsillar pillars and posterior tonsillar pillars), base of tongue, glossotonsillar sulci, vallecula, soft palate (including the uvula), lateral oropharyngeal walls, and posterior oropharyngeal wall (Figure 2). Most oropharyngeal cancers arise from the tonsil or base of tongue.

Physicians can test for p16, a tumor suppressor protein that is overexpressed on HPV-positive tumor cells, utilizing immunohistochemistry (IHC), in addition to testing directly for high-risk HPV DNA with fluorescence in situ hybridization (FISH). Over the past 10 years, cancer centers have transitioned to only reporting the p16 status on pathology reports from oropharyngeal biopsies since it correlates so well with the HPV status. It should be noted that HPV-mediated oropharyngeal cancer, unrelated to smoking, has been shown to carry a better prognosis versus HPV-negative cancers caused by an extensive smoking history. The highest cure rates for HPV-mediated oropharyngeal cancer are typically

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reserved for non-smokers since extensive smoking history has been shown to decrease cure rates in this population of patients.

The most common presenting symptoms of oropharyngeal cancer include a tender or painless neck mass, ear pain (otalgia), and/or sore throat. People with any of these symptoms should promptly seek medical attention, starting with their primary care physician, then likely followed by a referral to an otolaryngologist (ENT). After a focused physical examination (including nasopharyngolaryngoscopy), the work-up typically includes CT neck, PET/CT, and biopsy of any suspicious lesion and/or nodal mass.

After a cancer diagnosis is established, referrals to radiation oncology and medical oncology are the next steps to be evaluated for curative-intent chemoradiotherapy treatment. Optimal care for HPV-mediated oropharyngeal cancer includes a comprehensive multidisciplinary team approach, including speech pathology/swallow therapy, physical therapy, dental, audiometry, and nutrition. The 7-week chemoradiotherapy treatment course is rather demanding on the patient, both physically and emotionally, so a strong family / friend social support system is always very helpful (Figure 3). Fortunately, the cure rate for HPV-mediated oropharyngeal care is excellent so there is light at the end of the tunnel!

References available upon request.

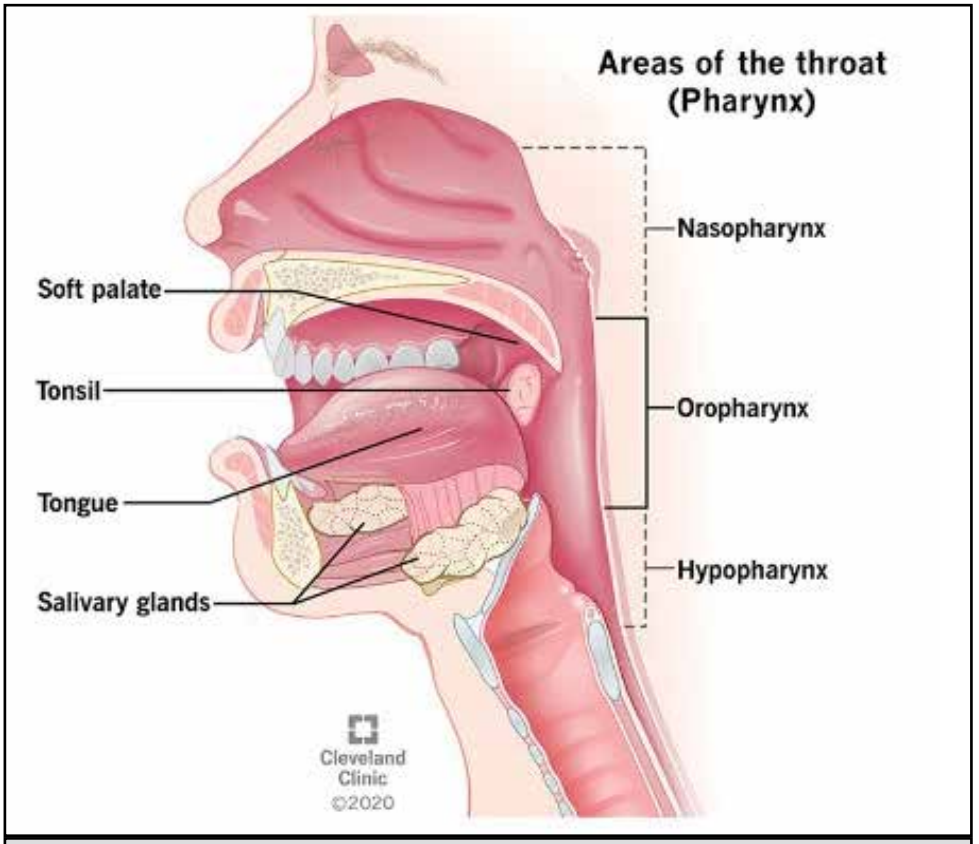

Figure 2: Areas of the Pharynx

Figure 3: Varian TruBeam Radiotherapy System

A Tribute to Gerold L. Schiebler, MD

Ira Gessner, MD, Retired Pediatric Cardiologist
Charles Riggs, Jr., MD, Retired Hematology/Oncology Professor

Ira Gessner, MD

Charles Riggs, MD

Gerold L. Schiebler, MD introduced himself to me as "The Schieb" 6 years ago. He would often call the ACMS office to comment on certain articles in House Calls and say how much he appreciated the publication. We were saddened to hear that Dr. Schiebler passed away on March 2nd at the age of 95, and have asked Dr. Ira Gessner and Dr. Charles Riggs to write a memoriam for him, as they knew him both personally and professionallyl for many years.
Jackie Owens, ACMS EVP

Ira Gessner, MD on Gerold Schiebler, MD:

It might seem easy to write about Gerold L. Schiebler: valedictorian and class president at Hamburg, PA high school; magna cum laude graduate at Franklin and Marshall; Harvard Medical School; Mass General, the University of Minnesota, and the Mayo Clinic for residency and fellowship in pediatrics and pediatric cardiology; a greater than 40-year academic career at UF College of Medicine, including 17 years as Chair of Pediatrics; major contributor to pediatric cardiology literature; revered mentor to medical students, residents, and budding pediatric cardiologists (including this writer); state and national leader in advancing children's health; the only person from the University of Florida accepted into the National Academy of Sciences Institute of Medicine; recipient of numerous major state and national awards; the list can go on for quite a while.

What seems not so easy is conveying the essence of an individual who was so selfless, so caring of family, patients, colleagues and students, so committed to his goals, and so successful in living a life of purpose, dedication and achievement.

One cannot distill Gerry Schiebler's life down to a few paragraphs. Here, then, are just a few remarks. A teacher, who became principal, described Gerry as "the smartest person ever to graduate from Hamburg High School." Arlan Rosenbloom, a colleague in the Department of Pediatrics, who also died recently, described Gerry by saying, "He never did anything for himself. He always acted in the best interest of kids. He was never self-serving. He is the most unselfish, caring person of power you could ever meet." In all of his actions, whether medical or political, Gerry demonstrated great wisdom as well as great intelligence. He employed his abilities to great advantage, always focused on his primary goal of advancing the health and well-being of all children.

When Gerry joined the faculty at UF in 1960, Florida's state-sponsored care of children, The Crippled Children's Bureau, managed only orthopedic care. Children with congenital heart defects were sent by train to receive free care at Johns Hopkins in Baltimore. Private medical insurance policies excluded newborns for the first 30, some as much as 90, days of life. To deal with what he considered an enormous injustice as well as an enormous impediment to practicing his specialty in Florida, Gerry became a politician. He made the giant step of taking on the medical insurance establishment. Several years of persistent lobbying resulted in the legislature enacting and the Governor signing what we call the "Babies Insurance Bill" requiring that a family policy cover a newborn at birth. The process was not easy. Gerry received telephoned death threats. Similar threats were directed at his family. He called his father in Germany and asked, "Should I stop pushing this bill?" Making an analogy with the effects of two world wars on their family, his father said that if this was his battle "You have to take the risk, go forward and don't look back." Florida became the first state to enact this singular requirement. The rest of the country soon followed.

Gerry determined that childrens' health deserved a more important "seat at the table." Together with Dr. Ed Rushton, Director of the Bureau, they turned their legislative and political skills to promote it from a Bureau to the Division of Children's Medical Services. Then he went to Tallahassee as its first Director and succeeded in expanding coverage to the full spectrum of chronic disease in children. Standards of care were established and facilities wanting to provide care to

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children were evaluated and approved at the state level. This became the most powerful health program for children in the United States.

Gerry's success as a politician included his uncanny ability to remember everything about people he met. With him in Chicago at a meeting of the American Academy of Pediatrics, boarded on an elevator on the first floor of The Palmer House hotel. The car stopped at the mezzanine and a gentleman entered. Gerry immediately greeted him by name. Recognizing that the man did not seem to know him, Gerry recounted, in detail, their association at Harvard some years before, including a personal anecdote. The totally bewildered man exited several floors up without having uttered a word. I said to Gerry, "That guy had no idea who was talking to him." Gerry smiled in acknowledgement, "But he probably enjoyed being recognized."

Gerry had an abiding and deep commitment to medical student education. This extended beyond patient care as he provided students with experience in the political process, the workings of the medical profession, and how to contribute to society. His remarkable ability to remember details about people helped him make everyone feel special and important. These qualities allowed him to develop great personal and professional relationships that he applied widely and successfully, including in the Florida legislature. Even after full retirement and moving to Amelia Island, Gerry continued to work on behalf of children, lobbying the state government, advising administrators throughout the University of Florida, and influencing the Florida Medical Association. The telephone in his condo stayed very warm..

Gerold L. Schiebler, MD

The descriptor 'unique' gets used a lot, often incorrectly because it means sole, one of a kind. I have no reservation about calling Gerold Schiebler unique. Naturally brilliant, devoted to his family, master clinician and teacher, skilled politician, unselfish and caring in the extreme, and dedicated to the welfare of all children, he was truly one of a kind.

Many of the world's people benefitted greatly because Gerold L. Schiebler lived.

Charles Riggs, Jr., MD Tribute to
Gainesville's Eleanor and Franklin -
Audrey L. and Gerold L. Schiebler, MD,

Successful administrations often owe their actions and legacies to collaborations between ambitious executives and quietly effective behind-the-scenes advisors and guides. Such it was with President Franklin Delano Roosevelt, who truly awakened the sleeping giant of American industry and ingenuity, to put this country on a continuing path of achievement and world leadership. Much of the humanistic, egalitarian, and individual rights progress occurred with the quiet intercession of First Lady (now, FLOTUS) Eleanor Roosevelt and her particular, singular ability to identify that part of American life and liberty that needed fixing. Her successes in enfranchisement of women, ensuring minority rights, efforts on the global stage, and, the rights and welfare of children have been widely denoted and lauded by a retrospective media over the past couple of decades. We remember FDR for much, often with his First Lady at his side.

We in the ACMS, Florida Medical Association, state of Florida, American Medical Association, National Academy of Sciences/IOM, and physicians of every stripe have had Gerold L. Schiebler taken from us. If there's a plaudit, award, blue-ribbon panel, meritorious excellence achievement, or similar recognition, I am unaware of it (nor do I intend to list every honor bestowed on him!) When the subject of Dr. Gerold Schiebler arises in a group of

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Franklin L. and Eleanor L. Roosevelt

Florida physicians, nurses, health care officials, and any ordinary citizen who has met this remarkable man, the first topics of conversation invariably include his deep and infallible memory for minute details about them, their relatives, their hometowns, and their pets. It's been my observation that Mrs. Schiebler was often close by, and her contributions to Dr. Schiebler's public persona was acknowledged cheerfully and gratefully by him.

So it was when I first met Dr. and Mrs. Schiebler at the annual Florida Medical Association meeting in Ft. Lauderdale. They needed a ride to our ACMS dinner (a regular event at FMA Annual Meetings for the past couple of decades), as neither was driving at night then. By the time we reached the restaurant, I had been acquainted with more than sufficient facts, anecdotes, and minutiae about the ACMS, FMA, AMA and its constituents to overwhelm my meager faculties. All of these were delivered with good intent (do you know who is the only ACMS member to serve as the University of Iowa's sports' mascot, Herky the Hawk?) and for the better understanding of the diverse roles of physicians in maintaining the integrity and dignity of medical practice.

Equally were the observations, comments, and "fill in the blanks" provided by Mrs. Schiebler. In that evening's story-telling, she strode the bedrock of her own remarkable achievements and contributions to the practice of medicine. Upon locating to Gainesville, she became active, and President, in the local Junior League. From that vantage point, and calling upon her considerable career in obstetrical nursing, she guided the Association of Junior Leagues to study support services for children. That survey produced the Alachua County Council of Child Abuse which was the springboard to initiating the Guardian Ad Litem program in this State, which she headed up until 1985. At a time when the lobbying face of the FMA was an older white male physician, she broke that mold by chairing the FMA's Committee on Child Advocacy, a hitherto-unheard of role for a non-physician and a woman. Her presence in Tallahassee dovetailed well with Dr. Schiebler's local, statewide, and national pediatric agendas, resulting in more comprehensive and more readily available preventative, medical, and social base for an often overlooked pediatric population. On the Gainesville front, Mrs. Schiebler served as President of The University of Florida Medical Guild in 1969 (one First-Husband activity I can share with Gerry Schiebler!), and was instrumental in starting Gainesville's Ronald McDonald House. She also successfully influenced pediatric health-care policy at the national level, with appointments to the National Committee for the Prevention of Child Abuse, the National Committee of Council for Children and the International Board of the Junior Leagues.

My purpose has been in no way to diminish the remarkable achievements and honors accorded to our Dr. Gerry Schiebler by weaving into his story those which illustrated Mrs. Audrey Schiebler's roles. His legacy will long be part of Gainesville's, Florida's, and America's practice, teaching, and administration of medicine, especially pediatrics. I encourage every medical professional to keep the traditions of Audrey and Gerry Schiebler active, by retelling the stories and anecdotes that keep alive the best of our medical lore.

Gerold L. and Audrey L. Schiebler

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Review of Aortic Stenosis and Transcatheter Aortic Valve Implantation (TAVI/TAVR)

By: Roja C. Pondicherry, MD, The Cardiac and Vascular Institute

Introduction:

Aortic stenosis (AS) is caused by progressive calcification of the valve and is the most common cause of left ventricular outflow tract obstruction. The classic clinical manifestations of AS are heart failure (HF), syncope, and angina. However, these "classic" manifestations reflect end-stage disease. Now, with earlier diagnosis, the most common presenting symptoms are: dyspnea on exertion or decreased exercise tolerance, exertional dizziness (presyncope) or syncope, and exertional angina.

Stages of Aortic Stenosis: Severe AS is defined as a valve area ≤1.0 cm2, an aortic velocity 4.0 m/s or higher, and/or a mean transvalvular gradient ≥40 mmHg. There is wide variability in the degree of outflow obstruction that causes symptoms, depending upon

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Stage	Definition	Valve Anatomy	Valve Hemodynamics	Hemodynamic Consequences	Symptoms
A	At risk of AS	•Bicuspid aortic valve (or other congenital valve anomaly) •Aortic valve sclerosis	Aortic V_{max} < 2 m/s with normal leaflet motion	None	None
B	Progressive AS	•Mild to moderate leaflet calcification/fibrosis of a bicuspid or trileaflet valve with some reduction in systolic motion or •Rheumatic valve changes with commissural fusion	• **Mild AS:** Aortic V_{max} 2.0-2.9 m/s or ΔP_{mean} < 20mm HG • **Moderate AS:** Aortic Vmax 3.0-3.9 m/s or ΔP_{mean} 20-39 mm HG	• Early LV diastolic dysfunction may be present • Normal left ventricular ejection fraction (LVEF)	None
C: Asymptomatic severs AS					
C1	Asymptomatic severe AS	Severe leaflet calcification or congenital stenosis with severely reduced leaflet opening	• Aortic V_{max} ≥ 4 m/s or ΔP_{mean} ≥40 mm Hg • Aortic valve area (AVA) typically ≤1.0 cm^2 (or AVAi 0.6 cm^2/m^2) but not required to define severe AS • **Very severe AS:** Aortic V_{max} ≥ 5 m/s or ΔP_{mean} ≥ 60 mm Hg	• LV diastolic dysfunction • Mild LV hypertrophy • Normal LVEF	None: Exercise testing is reasonable to confirm symptom status
C2	Asymptomatic severe AS with LV dysfunction	Severe leaflet calcification/fibrosis or congenital stenosis with severely reduced leaflet opening	• Aortic V_{max} ≥ 4 m/s or ΔP_{mean} ≥ 40 mm Hg • AVA typically ≤ 1.0 cm^2 (or AVAi 0.6 cm^2/m^2	LVEF < 50%	None
D: Symptomatic severe AS					
D1	Symptomatic severe high-gradient AS	Severe leaflet calcification/fibrosis or congenital stenosis with severely reduced leaflet opening	• Aortic V_{max} ≥ 4 m/s or ΔP_{mean} ≥ 40 mm Hg • AVA typically ≤ 1.0 cm^2 (or AVAi ≤ 0.6 cm^2/m^2) but may be larger with mixed AS/AR	• LV diastolic dysfunction • LV hypertrophy • Pulmonary hypertension (PHTN) may be present	• Exertional dyspnea or decreased exercise tolerance • Exertional angina • Exertional syncope or presyncope
D2	Symptomatic severe low-flow/low-	Severe leaflet calcification with severely reduced leaflet motion	• AVA ≤ 1.0 cm^2 with resting aortic V_{max} < 4 m/s or ΔP_{mean} < 40 mm Hg	• LV diastolic dysfunction • LV hypertrophy	• Heart failure (HF) • Angina
	gradient AS with reduced LVEF		• Dobutamine stress echocardiography (DSE) shows AVA <1.0 cm2 with V_{max} ≥ 4 m/s at any flow rate	• LVEF < 50%	• Syncope or presyncope
D3	Symptomatic severe low-gradient AS with normal LVEF or paradoxical low-flow severe AS	Severe leaflet calcification/fibrosis with severely reduced leaflet motion	• AVA ≤ 1.0 cm^2 (indexed AVA ≤0.6 cm^2/m^2) with an aortic V_{max} < 4 m/s or ΔP_{mean} < 40 mm Hg, AND • Stroke volume index < 35 mL/m^2 • Measured when patient is normotensive (systolic blood pressure <140 mm Hg)	• Increased LV relative wall thickness • Small LV chamber with low stroke volume • Restrictive diastolic filling • LVEF ≥ 50%	• HF • Angina • Syncope or presyncope

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patient size and level of physical activity. However, when severe AS is present, even mild cardiac symptoms require prompt intervention because average survival without valve replacement is only two to three years, with a high risk of sudden death. AS is a progressive disease with sequential stages (Table 1) defined according to valve anatomy, valve hemodynamics, hemodynamic consequences of AS, and symptoms.

Transthoracic echocardiogram (TTE) is the standard diagnostic test in the initial evaluation of patients with known or suspected AS. In selected patients, additional testing, such as stress testing, TEE, cardiac catheterization, and CT or cardiac MR imaging, might be indicated. Regular follow-up with periodic examinations and TTE is necessary to prevent the irreversible consequences of severe AS, primarily affecting the ventricular function, which may occur in the absence of symptoms. Frequency of echocardiograms in asymptomatic patients with valvular heart disease (VHD) and normal left ventricle function is listed in Table 2. Patients with Stages C2 and D disease are not included in this table because they would be considered candidates for intervention.

Table 2. Frequency of Echocardiograms in Asymptomatic Patients With VHD and Normal Left Ventricular (LV) Function

	Valve Lesion			
Stage	**AS'**	**AR**	**MS**	**MR**
Progressive (stage B)	Every 3-5 yrs. (mild severity; V_{max} 2.0-2.9 m/s)	Every 3-5 yrs. (mild severity)	Every 3-5 yrs. (mitral valve area [MVA] >1.5 cm^2)	Every 3-5 yrs. (mild severity)
	Every 1-2 yrs. (moderate severity; V_{max} 3.0-3.9 m/s)	Every 1-2 yrs. (moderate severity)		Every 1-2 yrs. (moderate severity)
Severe Asymptomatic (stage C1)	Every 6-12 months (V_{max} ≥ 4 m/s)	Every 6-12 months	Every 1-2 yrs. (MVA 1.0-1.5 cm^2)	Every 6-12 months
		Dilating LV: More frequently	Every year (MVA < 1.0 cm^2)	Dilating LV: More frequently

In addition to routine periodic imaging, the onset of symptoms or a change in the physical examination should raise concern about the clinical significance of the valve lesion, necessitating a repeat TTE. Cardiology referral is recommended for all patients with symptomatic aortic stenosis, those with moderate and severe aortic stenosis without apparent symptoms, and those with left ventricular

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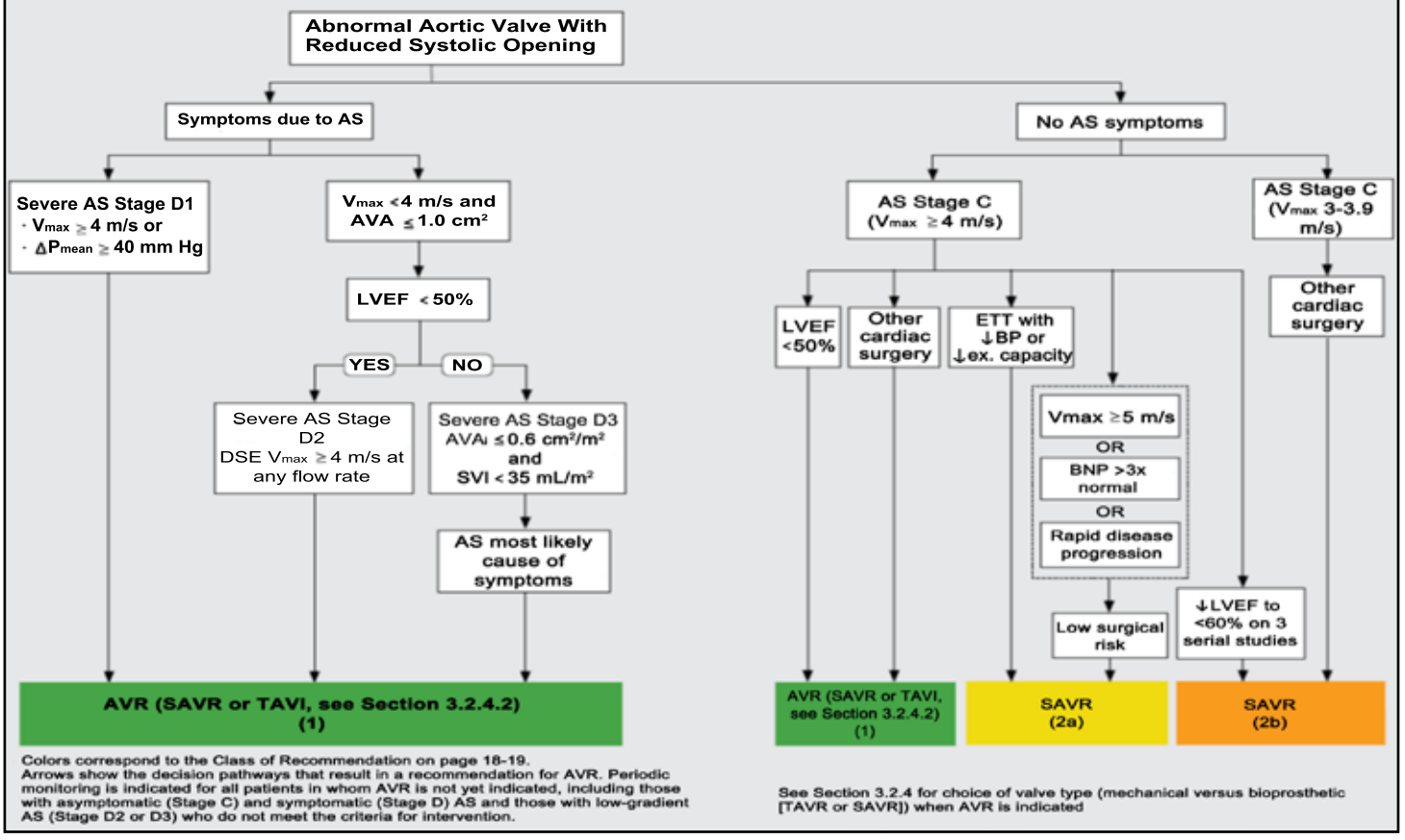
Figure 1. Timing of Intervention for AS



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dysfunction.

Timing of Intervention:
Intervention for severe AS is recommended on the presence of symptoms or LV systolic dysfunction (Class 1).

In asymptomatic patients at low surgical risk, intervention is reasonable with decreasing exercise tolerance or exercise-associated decrease ≥10 mm Hg in systolic blood pressure, very severe AS (Vmax ≥5.0 m/s), serum B-type natriuretic peptide (BNP) >3 times normal, or progression of Vmax ≥0.3 m/s per year (Class 2a).

In addition, intervention can be considered among asymptomatic patients with severe high-gradient AS and a progressive decrease in LVEF to <60% on ≥3 serial imaging studies (Class 2b).

Choice of Intervention:
All patients with severe valvular heart disease being considered for intervention should be evaluated by a Multidisciplinary Heart Valve Team. For patients with severe calcific AS with an indication for valve replacement, intervention options include surgical aortic valve replacement (SAVR) or transcatheter aortic valve implantation or replacement (TAVI or TAVR).

If life expectancy with SAVR or TAVI is ≤1 year or the patient's quality of life is unlikely to improve with SAVR or TAVI, palliative therapy with medical management is recommended.

If life expectancy with AVR is >1 year and the patient's quality of life is likely to improve with SAVR or TAVI, the next step in choosing therapy for symptomatic severe AS is evaluation of the risk of mortality and morbidity with SAVR (including the Society of Thoracic Surgeons Predicted Risk of Mortality [STS-PROM] and identification of contraindications to SAVR).

Extreme surgical risk (≥50 percent probability of death or serious irreversible complication): For patients with symptomatic severe AS with extreme surgical risk or an absolute contraindication to SAVR and in whom transfemoral TAVI is feasible, TAVI is recommended rather than medical therapy (**Grade 1B**). When transfemoral TAVI is not feasible, the Heart Valve Team should perform an individualized risk-benefit assessment of medical therapy versus alternative access TAVI.

High surgical risk (ie, STS-PROM >8 with <50 percent probability of death): For patients with symptomatic severe AS with high surgical risk in whom transfemoral TAVI is feasible, transfemoral TAVI is recommended (**Grade 1B**). For patients in whom transfemoral TAVI is not feasible, the Heart Valve Team should perform an individualized risk-benefit assessment of SAVR versus alternative access TAVI.

Intermediate surgical risk (ie, STS-PROM 4 to 8): For patients with symptomatic severe AS with intermediate surgical risk in whom transfemoral TAVI is feasible **and** high risk anatomic features (such as an adverse aortic root, low coronary ostia height, heavily calcified bicuspid aortic valve, and severe left ventricular outflow tract calcification) are absent, transfemoral TAVI is recommended (**Grade 1B**). For patients in whom transfemoral TAVI is not feasible, SAVR is recommended (**Grade 1B**).

Low surgical risk (ie, STS-PROM <4): Optimum criteria for choice of intervention in patients with low surgical risk are uncertain. In patients with low surgical risk with **all four** of the following criteria (age ≥65 years, transfemoral TAVI is feasible, aortic valve is trileaflet, and

Table 3 — Risk Assessment for Surgical Valve Procedures

Criteria	Low-Risk SAVR (Must Meet ALL Criteria in This Column)	Low-Risk Surgical Mitral Valve repair for Primary MR (Must Meet AU Criteria In This Column)	High Surgical Risk (Any 1 Criterion in This Column)	Prohibitive Surgical Risk (Any 1 Criterion in This Column)
STS-predicted risk of death*	<3% AND	<1% AND	>8% OR	Predicted risk of death or major morbidity (all-cause) >50% at 30 d OR
Frailty†	None AND	None AND	≥2 Indices (moderate to severe) OR	≥2 Indices (moderate to severe) OR
Cardiac or other major organ system compromise not to be improved postoperatively‡	None AND	None AND	1 to 2 Organ Systems OR	≥3 Organ Systems OR
Procedure-specific impediment§	None	None	Possible procedure-specific impediment	Severe procedure-specific impediment

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absence of high risk anatomic features [such as an adverse aortic root, low coronary ostia height, or severe left ventricular outflow tract calcification]), transfemoral TAVI is recommended (**Grade 1B**). For patients who lack one or more of these four criteria, SAVR is preferred.

SAVR has demonstrated excellent durability and outcomes for both mechanical and bioprosthetic valves. More recent RCTs that included patients at low to intermediate surgical risk had a mean age in the mid-70s, but there were very few patients<65 years of age, so the evidence base cannot be extrapolated to these patients. In addition, valve durability is of higher priority in younger patients, who typically have a longer life expectancy and lower surgical risk. As longer-term data on TAVI valve durability become available, the age range for recommending TAVI may shift, but at this time the most prudent course, based on the published evidence, is to **recommend SAVR for adults <65 years of age** unless life expectancy is limited by comorbid cardiac or noncardiac conditions. There are no data for the use of TAVI in patients<65 years of age.

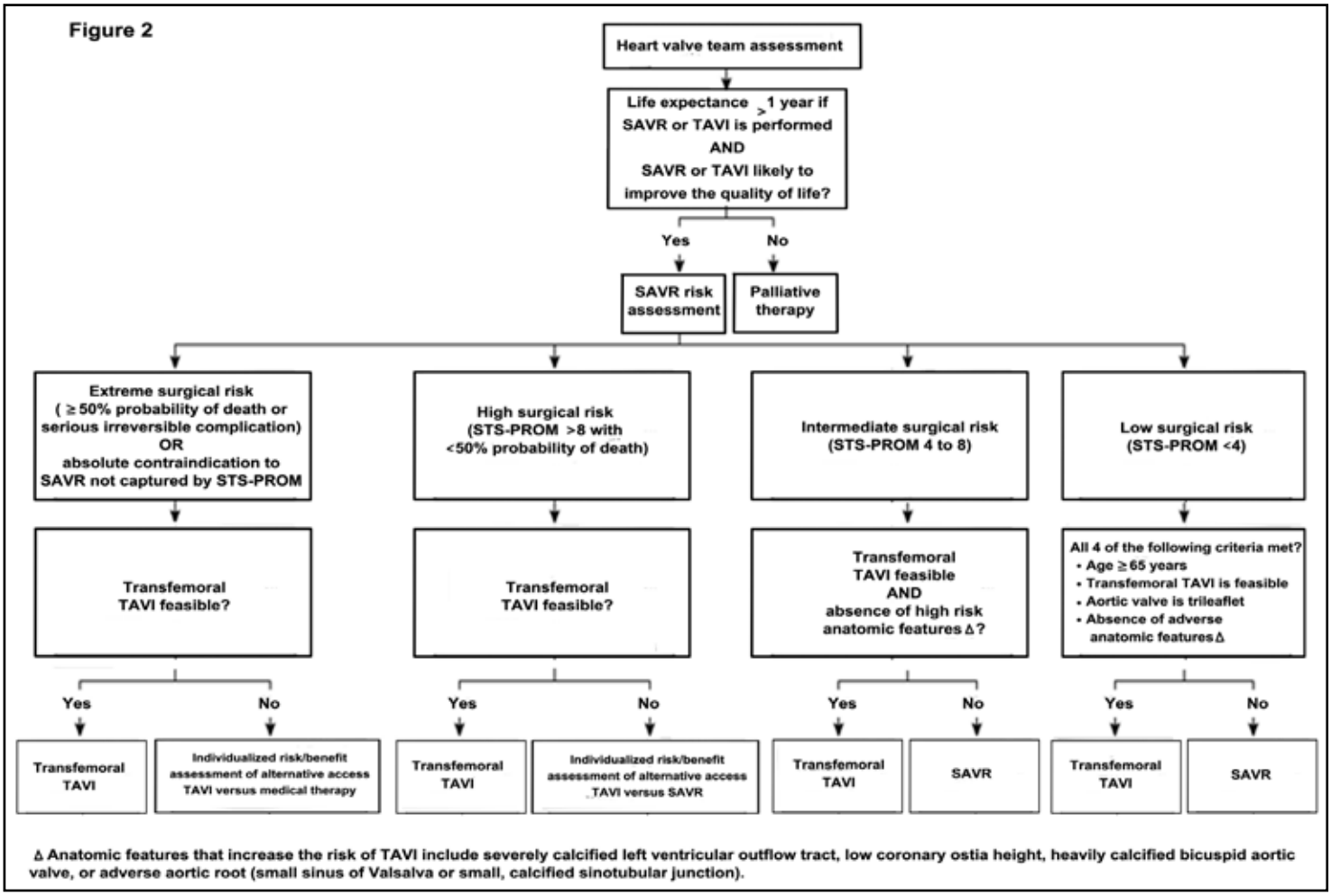
The final choice of implantation approach is based on a shared decision-making process that accounts for the patient's values and preferences and includes discussion of the indications for and against each approach and the potential need for and risks associated with valve reintervention.

TAVI outcomes by access site:

TAVI requires large-bore vascular access to accommodate the transcatheter heart valve and its delivery system, and as such a transfemoral (TF) arterial approach through the common femoral artery emerged as the access site of choice. However, TF TAVI remains challenging and sometimes unsafe in a minority of cases because of small vessel size, prohibitive atherosclerotic or calcific disease, or excessive tortuosity. Alternative transarterial routes include the carotid artery or the ascending aorta, which requires surgical techniques. The subclavian and axillary arteries can be approached surgically or with completely percutaneous techniques. There are also transvenous pathways (Figure 3).

Patients undergoing transfemoral TAVI have better outcomes than patients undergoing alternative (nontransfemoral) access TAVI, as indicated by subgroup analyses of meta-analyses and individual trials. As an example, a meta-analysis of 27 observational studies and one randomized trial with a total of 17,020 patients undergoing TAVI found that 30-day mortality was 4.7

Figure 2



Δ Anatomic features that increase the risk of TAVI include severely calcified left ventricular outflow tract, low coronary ostia height, heavily calcified bicuspid aortic valve, or adverse aortic root (small sinus of Valsalva or small, calcified sinotubular junction).

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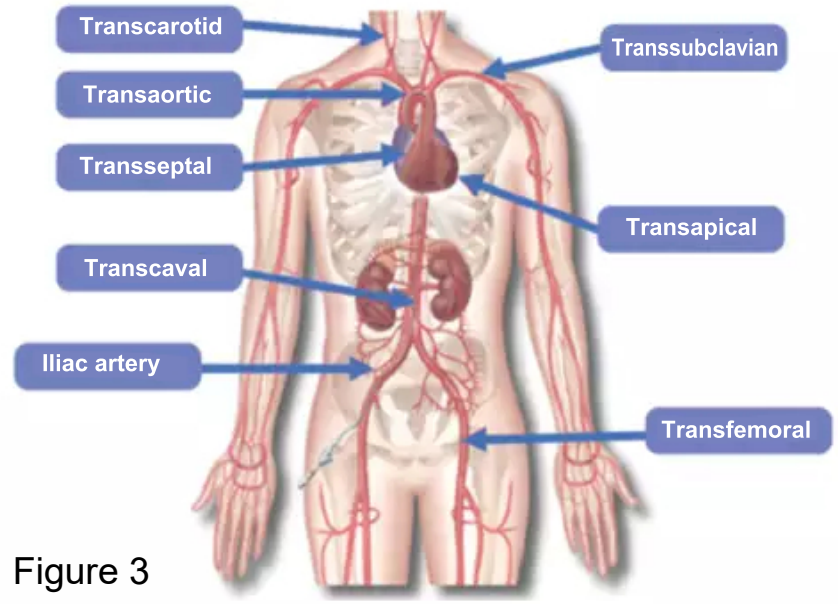


Figure 3

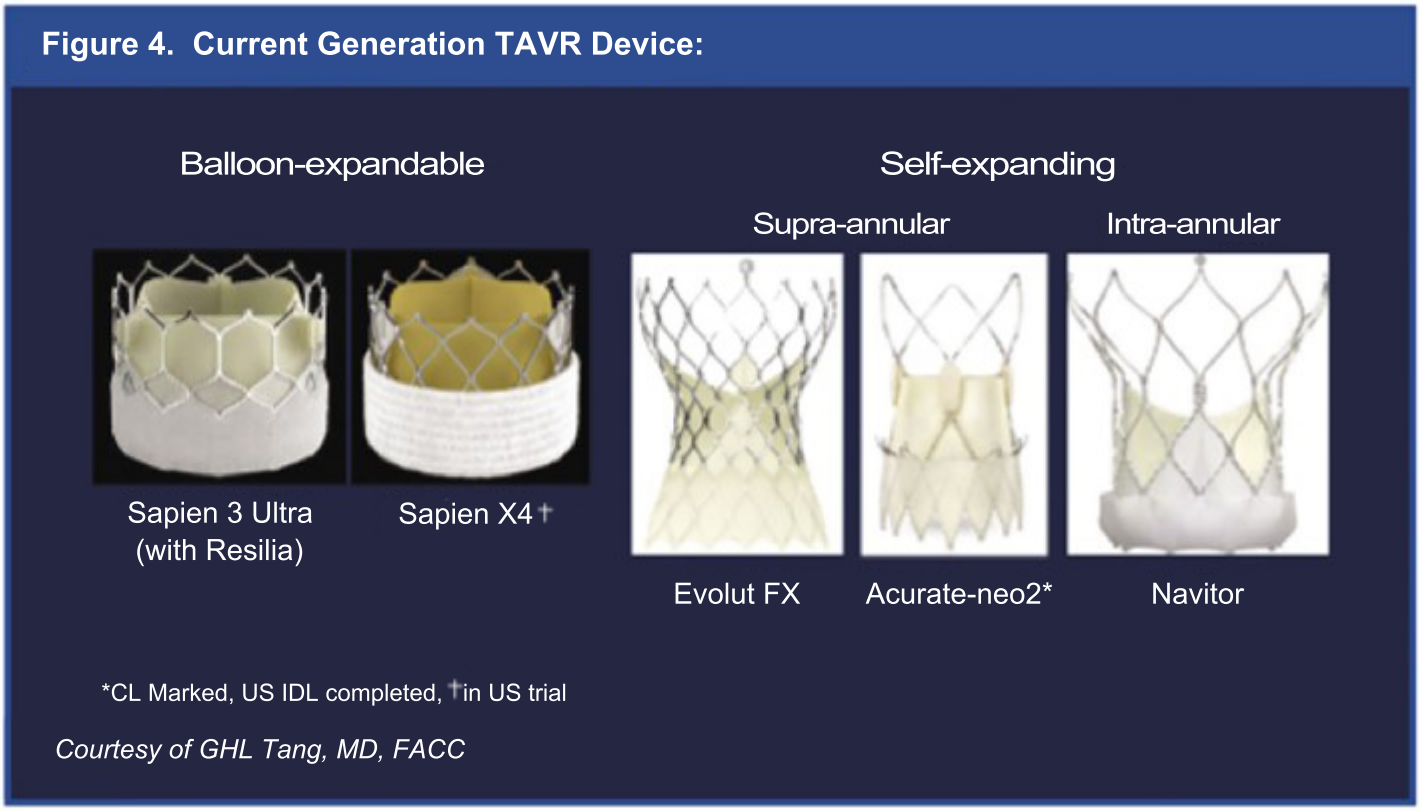
percent with the transfemoral approach and 8.1 percent with an alternative approach. One-year mortality was 16.4 percent with transfemoral access and 24.8 percent with nontransfemoral access. However, the available data are not adequate to determine how much of the excess mortality seen in patients undergoing alternative access TAVI is caused by the alternative access procedure and how much is caused by excess comorbidity associated with the need for alternative access.

Transcatheter aortic valve types:
The two predominant types of commercially available TAVI valves are balloon-expandable valves and self-expanding valves. Self-expanding valves provide a larger effective orifice area and lower gradient, particularly those valves with a supra-annular design, but they tend to be associated with a greater need for new pacemaker implantation, as compared with balloon-expandable valves. Balloon-expandable valves, on the other hand, allow for more precise positioning and deployment, allowing a faster procedure and minimizing complications (Figure 4).

Data directly comparing clinical outcomes with balloon-expandable and self-expanding valve are limited; observational studies suggest no significant differences in outcomes among valve types. Further study, including an adequately powered study with long-term outcomes, is needed to compare balloon- and self-expanding valve types.

TAVI complications:
Procedural complications include vascular issues, valvular complications (annular rupture, valve malpositioning, and paravalvular aortic regurgitation), arrhythmias (conduction abnormalities), coronary artery occlusion, myocardial infarction (MI), cerebrovascular

Figure 4. Current Generation TAVR Device:



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accident, and death. Periprocedural mortality for TAVI has ranged from 1.1 to 4.2 percent in registry reports. Reduction of the mortality risk of TAVI requires a multidisciplinary approach for appropriate case selection, careful procedural planning, effective operator training and experience, meticulous attention to vascular closure, and judicious aftercare including appropriate rehabilitative measures and drug therapy.

Long-term complications include aortic regurgitation, prosthetic valve thrombosis, late bleeding, and prosthetic valve endocarditis. At least mild paravalvular aortic regurgitation is commonly detected following TAVI. The presence of moderate or severe paravalvular aortic regurgitation has been associated with increased one-year mortality rates.

TAVI post-procedural care:

Surveillance echocardiogram - Care post-TAVI includes clinical and echocardiographic follow-up of bioprosthetic valve function, including assessment of the transvalvular gradient and surveillance for complications. Patients typically undergo routine clinical evaluation including echocardiography prior to discharge and at one-month follow-up, at 6 to 12 months, and then annually. More frequent follow-up is required for complications such as paravalvular regurgitation and associated conditions such as heart failure.

Endocarditis prophylaxis - All patients with prosthetic valves, including those who have undergone TAVI, are considered among those at highest risk for endocarditis. Patient education should include instruction regarding the risk of infective endocarditis, the importance of optimal dental hygiene, and the need for endocarditis prophylaxis at the time of relevant dental procedures.

Post-TAVI thrombotic therapy:

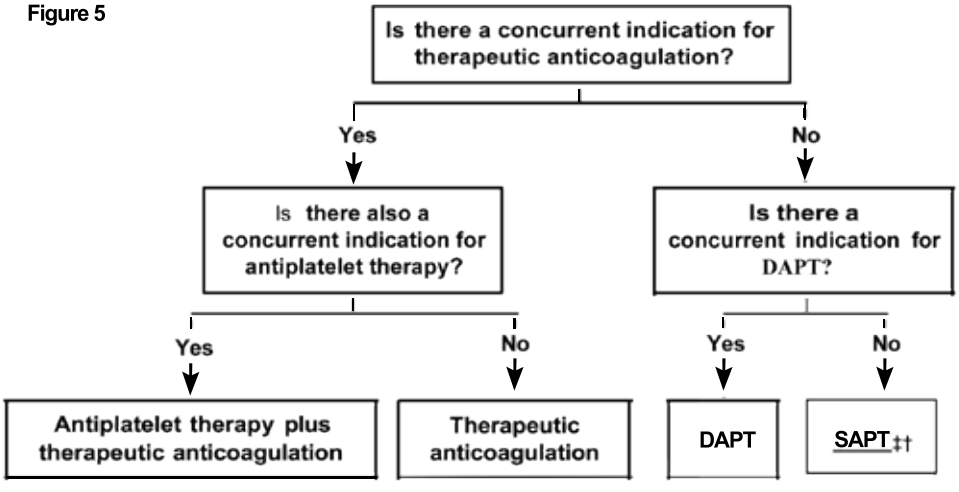
Post-TAVI antithrombotic therapy varies depending upon whether there is a concurrent indication for anticoagulation (Figure 5).

Patients without a concurrent indication for anticoagulation are generally treated with chronic antiplatelet therapy post-TAVI (in the intermediate and long term). It is reasonable to use DAPT in the intermediate term (during the initial 3 to 6 months depending upon valve type) followed by lifelong SAPT, which is the approach used in the pivotal TAVI trials. If intermediate-term DAPT is chosen, it is continued for the first six months (for the SAPIEN valve) or for the first three months (for the Evolut R/PRO/PRO-PLUS valve). Long term SAPT generally consists of aspirin 75 to 100 mg daily; if aspirin is contraindicated, clopidogrel 75 mg daily is an alternative. In the available clinical trials, the risk of stroke appears to be similar with SAPT and DAPT, but SAPT is associated with lower bleeding risk.

For a patient post-TAVI with a concurrent indication for therapeutic anticoagulation (such as atrial fibrillation [AF] with criteria for anticoagulation) and no concurrent indication for antiplatelet therapy, anticoagulation is prescribed and no additional antithrombotic therapy for TAVI is required.

A patient post-TAVI with a concurrent indication for therapeutic anticoagulation (e.g., AF) and a concurrent indication for antiplatelet therapy (e.g., recent coronary artery stent) is treated with anticoagulant plus antiplatelet therapy. Long-term triple antithrombotic therapy (anticoagulation plus dual antiplatelet therapy [DAPT]) is generally avoided.

Figure 5



‡ SAPT is generally aspirin 75 to 100 mg daily. If aspirin is contraindicated, clopidogrel is an alternative.
† A reasonable alternative is to use DAPT in the intermediate term (during the initial 3 to 6 months post-TAVI depending upon valve type) followed by lifelong SAPT, which is the approach used in the pivotal TAVI trials.

Conclusion:

Advances in TAVR have transformed the treatment landscape of patients with AS over the past two decades owing to a constant evolution in procedural techniques and device technology. While the next generation of transcatheter heart valves are proving to be safer and more effective than their predecessors, a greater focus on the lifetime management of aortic stenosis becomes important as younger and lower-risk patients are likely to outlive their transcatheter valve.

References available upon request.

Too Big to Fail: An Update on Heart Failure in 2024

By: Carl Dragstedt, DO, Cardiologist, Malcolm Randall VA Medical Center; ACMS Immediate Past-President

Nobody likes to fail! From the time we are children and playing in our first recital or youth sports competition on through the often arduous and challenging nature of medical training, we have been motivated to achieve success. Despite our imperfect humanity, failure in any form may seem antithetical to many of us in our lives as physicians. We may become perturbed when our computers crash, inconvenienced when our vehicles are out of commission for repairs, and (perhaps most alarming of all) paralyzed when our WiFi goes down. Yet, if we get down to brass tacks, these minor deviations from peace and tranquility pose relatively little existential threat when compared with the prospects of living with heart failure.

Heart Failure. Congestive Heart Failure. "CHF". Whichever term we use and regardless of our area of clinical focus, most of us have at least some familiarities with this frequently encountered condition. As the U.S. #1 billed diagnosis-related group for acute patient care, the burdens of heart failure extend deeply into American life. The Heart Failure Society of America estimates that 6.5 million Americans are suffering, with up to 960,000 new diagnoses occurring each year. It is believed that heart failure accounts for more than a third of all cardiovascular-related deaths. Perhaps most sobering of all: for the average person living with heart failure, approximately half will be dead within 5 years. (1) From a public health perspective, this should (and does!) sound alarm bells for action.

In very basic terms, heart failure represents a constellation of clinical signs and symptoms that result from the heart's inability to meet the body's physiologic needs. As physicians we observe and listen to patients, generate clinical gestalts and heuristics, ultimately leading us to draw reasonable clinical conclusions and treatment recommendations. These are skills we've developed through years of practice, and which cannot be replicated without longitudinal clinical training which can span up to a decade. Simple concept, right? Not so fast! A deeper understanding of heart failure informs us that while heart failure may represent commonly-recognized symptoms, our charge as physicians remains to accurately identify the most likely specific etiology accounting for our patient's presentation.

A brief word on medical economics: for those of us who consider ourselves concerned taxpayers, the economic burden attributable to heart failure cannot and should not be ignored. Up to 80% of the total expenditures of any one individual's lifelong heart failure care are paid out for acute inpatient hospitalizations. Following the diagnosis of heart failure, the average patient will generate approximately $84,000 in lifetime inpatient care costs.(2) It is no surprise that payors, regulatory agencies, and health systems perennially identify a reduction in heart failure re-admissions as a top priority.

Generally speaking, heart failure associated with the left ventricle can be broken down into two broad categories: heart failure with reduced ejection fraction (HFrEF) or heart failure with preserved ejection fraction (HFpEF). The ejection fraction cutoff for the former (<40%) and latter (>50%) are relative to the normal reference value (60%). It is estimated that each subtype accounts for roughly half of the disease prevalence of heart failure. More recently a third designation of heart failure with mid-range ejection fraction (HFmrEF) has been proposed.

The most common causes of heart failure include coronary artery disease (#1), COPD, hypertensive heart disease, and rheumatologic conditions; collectively, these are responsible for nearly two-thirds of heart failure cases.(3) In addition, valvular heart disease, as well as metabolic, immunologic, infectious, infiltrative and genetic etiologies also contribute to disease burden. Heart failure may also manifest as isolated right ventricular dysfunction or result from high cardiac output states.

What can we physicians do to identify those "at risk" for heart failure? Some things we can't control: the greatest risk occurs in patients > 65 years old, where it is estimated that approximately 60% of patients will have clinical heart failure in their lifetime. We can, however, exert influence over a given patient's hypertension, coronary artery disease, risk for myocardial infarction, valvular heart disease, diabetes, obesity, and pulmonary diseases including sleep apnea; these are all known and well-established risk factors for incident heart failure. As physicians, it is our moral imperative to identify the presence of these associated conditions and offer patients preventative strategies to mitigate their risk for developing heart failure later in life. Like many areas of medicine, prevention is the key! Yet sadly most patients will present to us in clinic or the hospital already manifesting clinical symptoms of heart failure. They will

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exhibit worsening dyspnea on exertion, fluid retention, a chest x-ray showing pulmonary vascular congestion, declining stamina, relative hyper- or hypotension, weight gain, abnormal heart rhythms, elevated biomarkers (e.g. cardiac-specific troponin, brain natriuretic peptide), or evidence of end-organ dysfunction or multi-system organ failure.

So, what tools do we have to help our patients achieve both enhanced quality and quantity of life?

For centuries, heart failure patients have benefitted from substantial pharmacological and invasive interventions. From as early as 1250 A.D., the Welsh family Physicians of Myddvai employed Digitalis purpurea (a derivative of the foxglove plant) to increase cardiac contractility in the treatment of the failing heart.(4) The past half-century has ushered in exciting, life-changing advancements in the pharmacotherapy for the management of patients with heart failure. Ground-breaking clinical trials of the 1980s and 1990s demonstrated the mortality benefits of beta blockers, ACE inhibitors/angiotensin receptor blockers, and mineralocorticoid receptor antagonists. The past decade has witnessed the emergence of game-changing therapies, including the angiotensin receptor/neprilysin inhibitor (ARNi) "Entresto" and the class of diabetes medications known as SGLT-2 inhibitors (e.g. "Jardiance", "Farxiga", "Invokana"). These newer agents promote sodium excretion and, therefore fluid loss. Many patients prescribed these medications may have decreased need or no longer require chronic diuretic therapy.

Several professional societies (including the American Heart Association, the American College of Cardiology, and the European Society of Cardiology) have provided strong (Class I) recommendations for so-called "quadruple therapy" for patients with HFrEF: this strategy consists of beta blockers, ARNi/ACEi/ARB, MRA, and SGLT-2 inhibitors.(5) As a medical community, we can do much better in adhering to these guidelines. A recent analysis has demonstrated that although 80% of HFrEF patients may qualify for all of these agents, only a mere 15.3% of those eligible are prescribed all 4 pillars of therapy at the time of hospital discharge. (6) It is not surprising that commonly cited concerns include exacerbating renal insufficiency, electrolyte abnormalities, or hemodynamic instability. Trial data suggest that as physicians we should feel confident in offering our patients this state of the art treatment; to do otherwise does them a disservice and provides suboptimal care.

A word about "diastolic dysfunction", or HFpEF. Since this cohort represents approximately 50% of heart failure cases, what pharmacologic strategies have been shown to be beneficial? Certainly, blood pressure control is paramount. The heart is a mechanical pump. If the resistance (afterload) in the systemic circulation remains elevated, the miracle workhorse will go into overdrive and compensate, for a time anyway. Ultimately, despite hypertrophy and dysregulated neurohormonal activity at the level of the myocyte, this magnificent machine is bound to fatigue and fail. When it comes to pharmacotherapy, unfortunately we have not observed the comparable and robust mortality benefits seen in the HFrEF drug trials. Yet all is not doom and gloom, however, with drug treatment options for HFpEF. On the upside, when we prescribe HFpEF patients SGLT-2 inhibitors, ARNis, and MRAs, we reduce the rate of heart failure hospitalizations.(7) In 2024, in light of the significant burdens of heart failure readmissions and dwindling hospital inpatient bed availability, we should consider this progress!

Today, we have an understanding of atherosclerosis' role in as well as the bi-directional relationship between arrhythmias (e.g. atrial fibrillation and cardiac conduction disease) and heart failure. Patients with HFrEF and multivessel coronary artery disease who undergo coronary artery bypass graft (CABG) surgery tend to live longer than those treated with medical therapy alone.(8) Among patients with atrial fibrillation and heart failure, emerging evidence supports a "rhythm control" strategy, particularly emphasizing an early use of a catheter-based ablation strategy to mitigate the interrelated effects of these conditions.(9) And for patients with HFrEF and high-grade conduction disease or left bundle branch block, the use of bi-ventricular pacing (or cardiac resynchronization therapy) has proven benefit on patients' symptoms and mortality.(10) Patients refractory to interventions and pharmacotherapy may benefit from implanted left ventricular assist devices (LVADs) or cardiac transplantation, as both have demonstrated improvements in lifestyle and longevity.

Despite the advancement of novel therapeutic agents and advanced procedures for the prevention and treatment of heart failure, I'd be remiss for glossing over some simple truths. So as not to forget the basics, it is imperative to encourage smoking cessation, exercise 30-45 minutes per day most days of the week, and adherence to a heart-healthy diet.(11) And the best news? None of these interventions require prior authorizations or prescriptions! As in many clinical scenarios, our challenge lies in the education and motivation of our patients. With modest alcohol consumption and regular exercise, whilst avoiding obesity and smoking, we can confidently advise our patients that they can expect to have 45% reduced risk for the development of heart failure!(12) From a value-based perspective and return on investment, there is little to nothing that can compare.

References available upon request.

A Brief Synopsis of Fractional Flow Reserve – CT (FFR – CT) Analysis - A Paradigm Shift in Coronary Imaging?

By: Scott Medley, MD, Retired Family Physician, and
Erin Keam Camenisch, HeartFlow District Manager

Scott Medley, MD

Erin K. Camenisch

[I was introduced to this new coronary imaging technology by my wonderful niece, Erin Camenisch, who is the District Manager in Nashville for HEARTFLOW, Inc. I was so struck by the new technology and the clarity of the coronary images that I was compelled to write about it in this "ADVANCES IN CARDIOLOGY" issue of HOUSE CALLS. This article "barely scratches the surface" of the FFR-CT story. Much of this quoted information comes from HEARTFLOW promotional literature and from its Clinical Dossier, which is 47 pages long and features 91 references! (1)]

"Bringing together human ingenuity and advanced technology to help combat heart disease, the #1 cause of death. HEARTFLOW'S non-invasive personalized cardiac test provides unprecedented visualization of each patient's coronary arteries, enabling clinicians to create more effective treatment plans for their patients. At the heart of our mission is a commitment to making cardiovascular care easier for doctors and safer for patients. Physicians get the critical information they need without the added risks and costs of an invasive procedure."

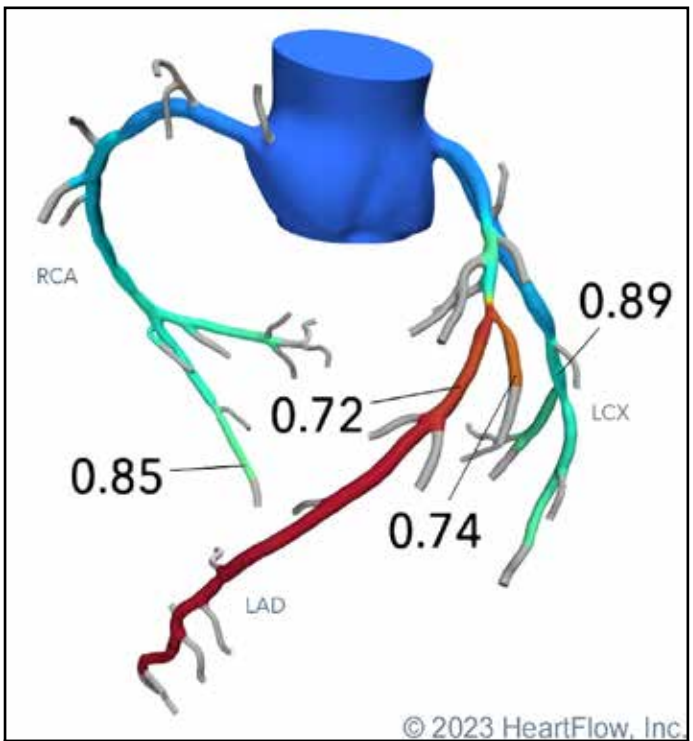

Figure 1: HeartFlow Analysis of Coronary Arteries.
A value of less than 0.8 indicates a significant blockage.

HEARTFLOW promotes these four characteristics of the technology:

"INTUITIVE: Interactive 3D model with clear results."

"SAFE: Accurate blood flow assessment without an invasive procedure."

"CONVENIENT: Software as a service platform using standard CT Scans with less than 2-hour average turnaround time."

"SEAMLESS: Integrates with existing hospital IT systems; secure access via Mobile; PACs, and EMR."

HEARTFLOW also states that:

---"80% of the top 50 U.S. heart hospitals have adopted HEARTFLOW"

--"99% of insurance providers, including Medicare and many Medicaid plans, cover FFR-CT"

---"FFR-CT cuts down on diagnostic catheterizations, preventing unnecessary procedures while ensuring the patients with CAD are diagnosed and get the medical care and revascularizations that are indicated."

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---"long-term studies with data out to 5 years"

---"500+ Peer- Reviewed Publications"

---"as of January, 2024, we have opened up our 800th site globally, and have served over 250,000 patients"

Accuracy: "The HEARTFLOW FFR-CT analysis pathway provides the highest diagnostic performance available from a non-invasive test compared to other diagnostic tests including CCTA, ICA, PET, CT perfusion, and SPECT to help identify FUNCTIONAL disease. This pathway leads to targeted treatment plans and a more streamlined patient experience. HEARTFLOW ... reduces unnecessary invasive testing and radiation exposure...the highly visual color-coded model resonates well with patients and can help increase adherence to treatment plans." The study "measures both the extent of an arterial blockage and the impact that the blockage has on the patient's coronary circulation." (Figure 1)

I don't pretend to understand the science, but "leveraging advanced algorithms incorporating artificial intelligence and computer dynamics, the HEARTFLOW Analysis 3D model is built. Within hours the clinician receives the HEARTFLOW Analysis via a secure website to assess, vessel by vessel, if sufficient blood flow is reaching the heart to better formulate a treatment path." The analysis uses "computational flow dynamics" to "assess the PHYSIOLOGY of the coronary flow pre- and post-lesion, in addition to the ANATOMY of the coronary vessel".

Some remarks from practicing cardiologists:

From Kavitha Chinnaiyan, M.D., Director of Cardiac Imaging Research, William Beaumont Hospital: "HEARTFLOW will transform the way we practice Cardiology."

And from a local Gainesville Cardiologist: "FFR-CT is indeed a remarkable new technology and one that is likely to see continued growth and adoption"...I am "aware of the data and excited about its continued growth."

And from some Major Studies: From the United Kingdom's National Institute for Health and Care Excellence (NICE) (May 2021) Guidance Document on FFR-CT (2):

"The case for adopting HEARTFLOW FFR-CT for establishing functional flow reserve from Coronary CT angiography is supported by the evidence. The technology is non-invasive and safe and has a high level of diagnostic accuracy."

From the American Heart Association and American College of Cardiology: Guidelines for the Evaluation and Diagnosis of Chest Pain. (Nov. 2021) (3):

"For intermediate-risk patients with acute chest pain and no known CAD with a Coronary Artery Stenosis of 40% to 90% in a proximal or middle coronary artery CCTA, FFR-CT can be useful for the diagnosis of vessel – specific ischemia and to guide decision – making regarding the use of coronary revascularization. For intermediate – high risk patients with stable chest pain and known coronary stenosis of 40% to 90% in a proximal or middle coronary segment on CCTA, FFRCT can be useful for diagnosis of vessel-specific ischemia and to guide decision- making regarding the use of coronary revascularization."

This technology may significantly reduce the number of unnecessary invasive cardiac catheterizations, as well as help ensure patients with advanced disease are not missed.

From Erin Camenisch: "My hope with this technology is that, over time and with the necessary clinical proof, we can get ahead of coronary artery disease through earlier detection, before symptoms start. Prescreening for breast and colon cancer is now standard-of-care, so how many of us would be spared the devastating effects of losing a loved one if we started screening earlier for heart disease?"

FFR-CT—A paradigm shift in coronary imaging? Time will tell, but I would bet on it!

References available upon request.

Rethinking Angina

By: Fernando Ortiz, MD,
The Cardiac and Vascular Institute

Introduction

Angina is a very common condition affecting over 11 million American adults. [1]. The management of angina or more specifically cardiac ischemia has mainly focused on the detection and treatment of obstructive coronary [epicardial] artery disease (CAD). The concept of ischemia or angina with non-obstructive coronary arteries (INOCA or ANOCA) has been described for decades, but it has recently reemerged in the clinical spotlight due to advances in accuracy and ease of detection. Approximately 40% of patients undergoing invasive angiography for the evaluation of angina are found to have non-obstructive CAD, fitting the clinical profile of ANOCA[2]. While 20% of patients with clinically proven ischemia (by non-invasive testing) will have non-obstructive disease on angiography. Using obstructive CAD as the standard needed for angina leads to many patients wrongfully diagnosed with "non-cardiac chest pain "or as having a false positive stress test. In fact, a recent study examining microvascular dysfunction in patients undergoing exercise stress tests showed that 100% of patients with a positive stress test but no obstructive disease on angiogram had coronary vascular dysfunction on invasive testing [3]. It is thus time to shift our conception of angina as a coronary epicardial problem and start to investigate and treat angina as a cardiovascular pathology.

Clinical Presentation

The majority of patients with ANOCA have angina provoked by exertion or emotional stress, which resolves with rest, consistent with "typical angina". However, approximately 40% of patients will have anginal equivalent symptoms (i.e. dyspnea) or describe chest pain as sporadic or at rest. Symptoms are usually stable and have been present for over 3 months, however waxing and waning has also been described. Patients typically go years without a diagnosis and usually have a decline in functional capacity over that time [4]. It is important to note the presence of ischemia on functional testing is not necessary for the diagnosis of ANOCA. Nevertheless, potential alternative causes of symptoms need to be excluded; obstructive CAD, pulmonary hypertension, hypertrophic or infiltrative cardiomyopathies, valvular heart disease, anemia, or pulmonary disease.

Pathophysiology

ANOCA is the resulting clinical syndrome caused by several coronary vascular pathologies (Figure 1)[5]. Identifying the underlying vascular dysfunction is essential

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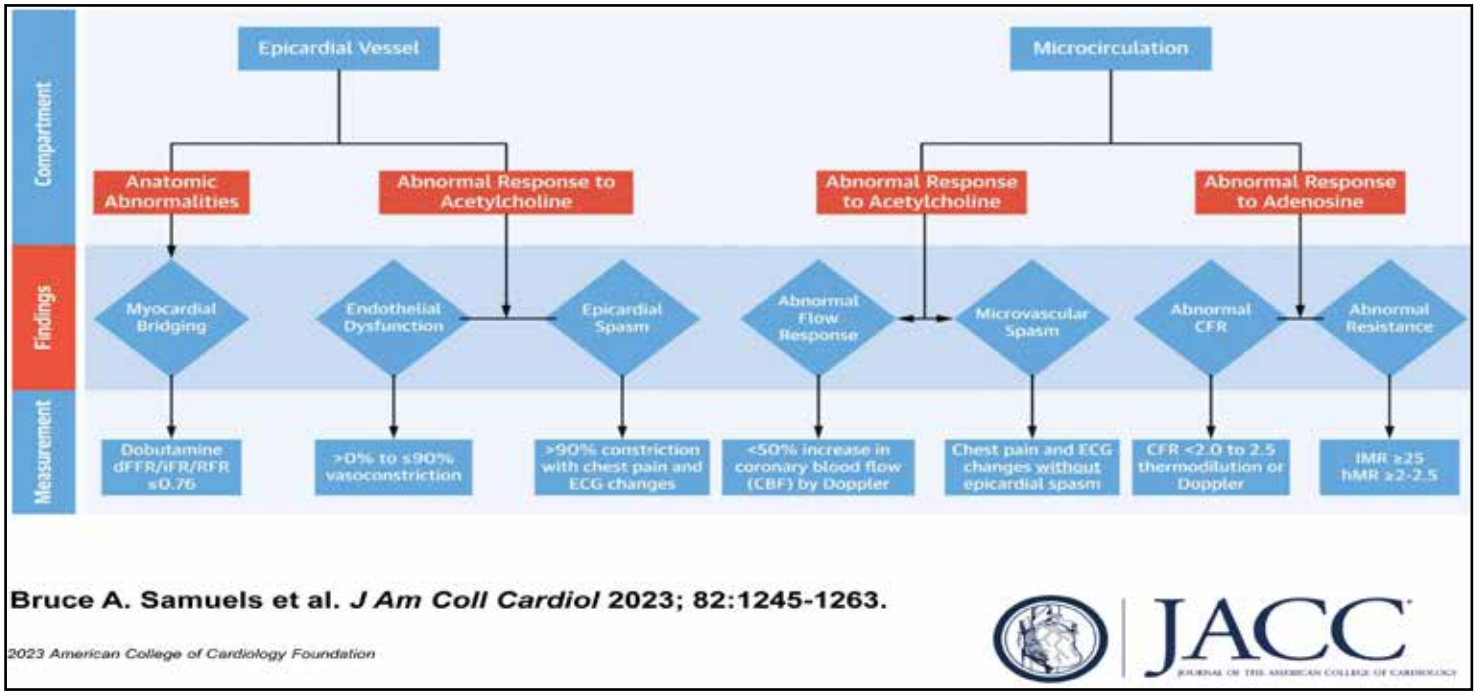
Figure 1:



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for the understanding of the mechanism and treatment of symptoms in the individual patient. Broadly, coronary vascular pathology can be divided into 4 categories; obstructive CAD, myocardial bridging, endothelium-independent microvascular dysfunction, and endothelium-dependent (vasospastic) vascular dysfunction. The first two categories involve epicardial luminal narrowing and are not the focus of this current paper.

Endothelium-independent microvascular dysfunction refers to increased resistance at the level of the arterioles and capillaries (microvasculature). Increased resistance could be due to impaired vasodilation or structural factors (luminal narrowing, vascular remodeling, vascular rarefaction, and extramural compression) (Figure 2)[6]. For simplicity, we will refer to endothelium-independent microvascular dysfunction as coronary microvascular dysfunction (CMD).

Endothelium-dependent microvascular dysfunction refers to coronary vasospasm in either or both the epicardial vessel or the microvasculature. Microvascular spasm is thought to occur due to an increase in inflammatory conditions which leads to an overproduction of vasoconstrictors causing impaired vascular reactivity.

Non-Invasive Evaluation

Non-invasive modalities have limited utility in the diagnosis or assessment of coronary vascular function as most tests were developed or calibrated for the detection of obstructive CAD. Cardiac positron emission tomography (PET) is the most accurate and prognostically validated modality for the evaluation of vascular dysfunction by the assessment of myocardial blood flow reserve [7,8]. Unfortunately, PET imaging cannot distinguish between obstructive CAD and CMD, and cannot evaluate for vasospastic disease.

Invasive Evaluation

To fully elucidate for ANOCA a comprehensive invasive evaluation must be performed. This assessment includes testing for CMD, microvascular spasm, epicardial spasm, endothelial dysfunction, and myocardial bridging. To correctly assess for these pathologies patients will need to discontinue caffeine, long-acting nitrates, beta-blockers, calcium channel blockers, ACEi, and ARB for at least 24 hours prior to the procedure. Because of the preparation needed to accurately measure CMD and vasospasm, ad hoc assessment during routine angiography is not feasible.

CMD is identified by measuring microvascular resistance (MVR) in the cardiac vascular bed. Simply, MVR is a ratio of distal coronary pressure to coronary blood flow during hyperemia (Derived from Olm's law). Calculating requires simultaneous measurements of distal coronary pressure and blood flow. This can be accomplished with the use of specialized wires that calculate flow by Doppler or thermosensing technique. Currently, the CoroFlow Cardiovascular System (Coroventis, Abbott) using the Pressure X (pressure-temperature sensing wire) is the only commercially available invasive system for measuring coronary flow. MVR measurements are independent of resting flow or hemodynamic changes. Values are reported as Index Microvascular Resistance (IMR) when using thermodilution to assess flow (see Dr. Medley's article in this issue for information about FFR-CT).

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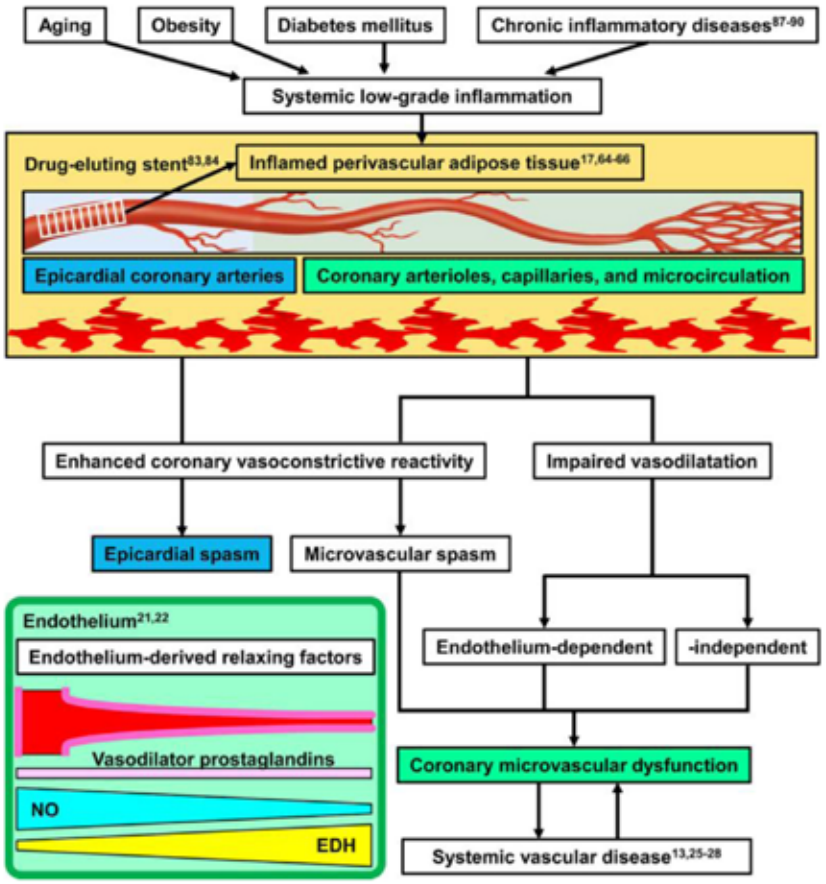
Figure 2



Continued from Page 20

Coronary Flow Reserve (CFR) is the ratio of coronary blood flow during rest and hyperemia, it represents the capacity of the coronary circulation to adapt to increases in myocardial demand. CFR considers both epicardial and microvascular function and hence it is not specific to MVD.

Coronary vasospasm is assessed by the administration of intra-coronary acetylcholine and then observing for epicardial vessel narrowing and clinical signs of ischemia such as angina or ECG changes. In healthy coronary arteries, acetylcholine induces endothelium vasodilatation mediated by the release of nitric oxide, which predominates over acetylcholine-induced smooth muscle constriction. When the endothelium is diseased, there is impaired release of nitric oxide leading to more vasoconstriction instead. Practically, coronary vasospasm can be subdivided into the following categories:

- Endothelial Dysfunction: Any epicardial constriction between (0%-90%).
- Microvascular Spasm: Ischemic ECG changes and angina in the absence of epicardial vasoconstriction.
- Epicardial Vasospasm: Visually severe vasoconstriction (> 75%) in addition to ischemic ECG changes or angina.

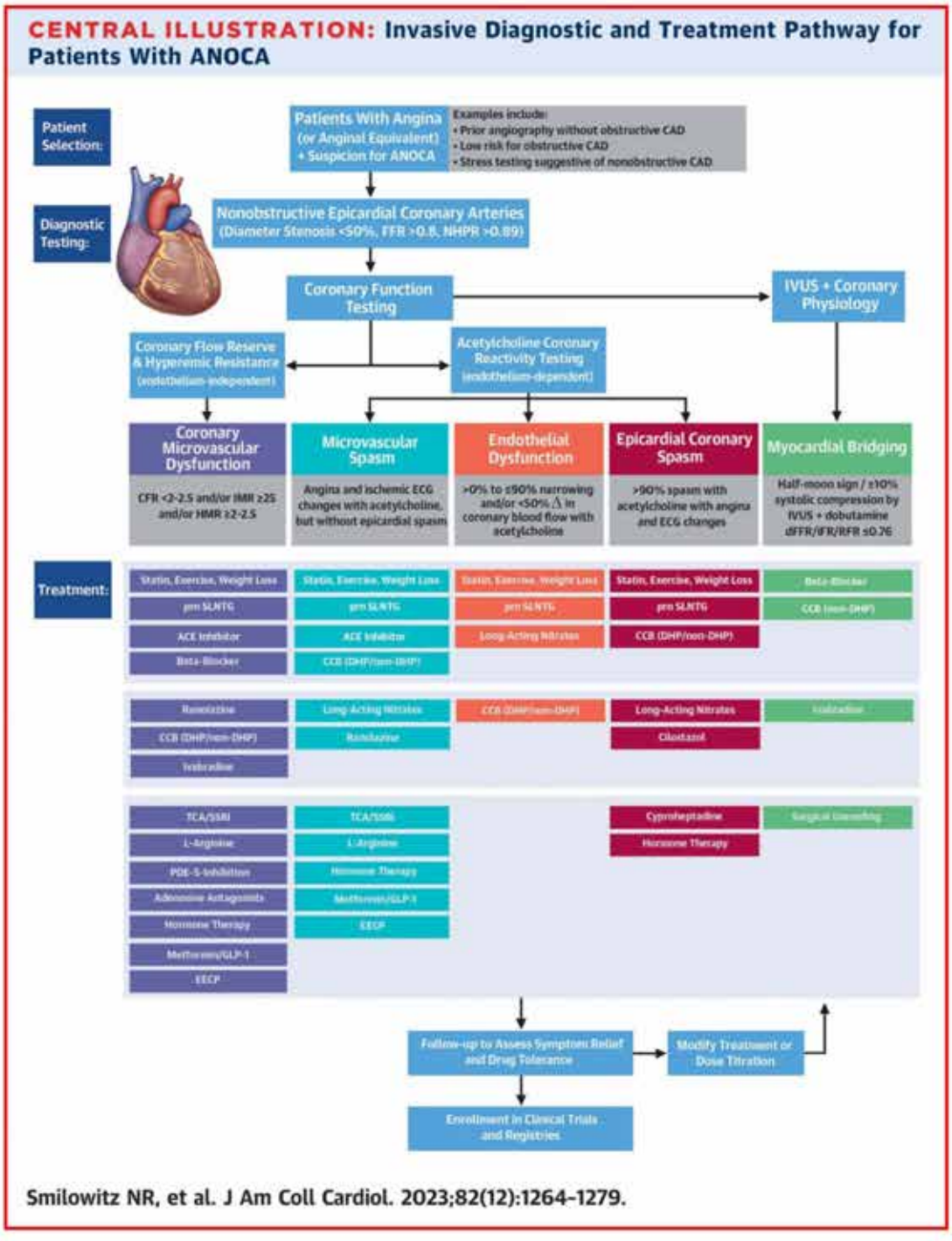
Finally, invasive microvascular and endothelial physiological testing is relatively low risk, with a major complication rate of 0.5% and a minor complication rate of 4.4%. Avoidance of complications by adherence to established protocols and monitoring for arrhythmias is of the utmost importance.

Conclusion

In conclusion, our presumption of angina as a disease of epicardial vessels is no longer valid. A "negative heart cath" should prompt further evaluation of the coronary vasculature, especially in those patients with ischemia on functional testing. Identifying the underlying cause of ANOCA cannot be underscored enough as it provides the patient with an explanation of their symptoms and allows for a more tailored treatment of their condition. (Figure 3) [9]

References avaialable upon request.

Figure 3:



HAPPENING

ACMS

Haven Hospice - Celebrating & Remembering Colleagues
at the E.T. York Hospice Care Center - October 24, 2023

L to R: Faye Medley, Scott Medley, MD and Janet Silverstein, MD

Kay Gaddy and Ann Grooms, MD

L to R: Rick Tarrant, MD; Roslyn Levy; Norman Levy, MD, PhD; and Tom Young, MD.

L to R: Ronald Jones, MD; Evelyn Jones, MD, Rogers Bartley, MD and Cherise Bartley.

L to R: David Thompson, MD; Bruce Stechmiller, MD, Andrea Briscoe; and Mark Barrow, MD (seated).

Pauline Taylor, Haven Hospice President; and Sharon Jones, Haven Hospice Vice President of Development.

Clark Gaddy, MD and Gordon Finlayson, MD.

L to R: Michael Lukowski, MD, Ellen Gershow and Caroline Rains, MD.

Scott Medley, MD hosting the event.

L to R: Rodger Powell, MD; Katy Powell; Mike Dillon, MD; Tom Zavelson, MD; and Gail Zavelson.

HAPPENI

ACMS

2024 ACMS Poster Symposium
UF Professional Park - January 24, 2024

Poster Symposium Participants.

Christopher Balamucki, MD, ACMS President with Poster Symposium Winners Kruti Patel, Brandon Lucke-Wold, MD; Kelly Davis, MD; Mayank Kotadia; and Chase Labiste.

L to R: Althea Tyndall-Smith, MD, ACMS Sectretary/Treasurer and Symposium Judge; Coy Heldermon, MD, PhD, Symposium Judge; and Priyanka Vyas, MD.

Steven Reid, MD; Jackie Owens, ACMS EVP; and Mack Tyner, MD

Symposium Judges Kathryn Alfonso, DO and Erika Griffith, with UF Health.

Poster Symposium Judge Michael Johnson, MD.

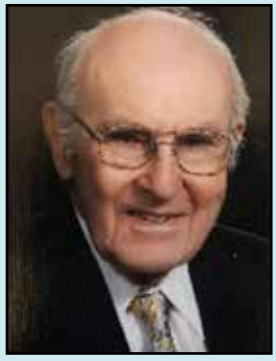
Participants, Judges and Mentors of the 2024 ACMS Poster Symposium. Thanks to our Sponsors UF Health and St. Johns Asset Management and to all our Judges for making this happen.

In Memoriam

Edward M. Copeland, III, MD - (1937 - 2024)

Edward M. Copeland, III, MD died peacefully at his home in Gainesville, Florida on March 31, 2024. He received his Medical Degree from Cornell University Medical College, then completed his Residency in General Surgery at the Hospital of the University of Pennsylvania followed by a two-year tour of duty in the United States Medical Corps. He completed an Advanced Surgical Oncology Fellowship at MD Anderson Hospital and Cancer Institute, joining the faculty there and the University of Texas Medical School at Houston. In 1982, Dr. Copeland joined the UF College of Medicine as the Chair of the Department of Surgery where he became the first Director of the University of Florida Shands Cancer Center. He is survived by his children, Edward (Jennifer) and Catherine, and 2 grandchildren. In lieu of flowers, donations are appreciated for the UF Health Department of Surgery Edward M. Copeland, III Foundation.

G. Leonard Emmel, III , MD - (1923 - 2024)



Dr. Emmel passed away March 23, 2024 at the age of 100 years. He received his Medical Degree from the University of Pennsylvania and completed his Residency from Vanderbilt Hospital and the Hospital of the University of Pennsylvania. He worked in research in the UP-Pharmacology department. He was a veteran who served in the US Army in WWII and the Korean War. In 1953, he returned to his hometown Gainesville, Florida and entered the private practice of internal medicine for over 36 years. Dr. Emmel served as President of Alachua County Medical Society and as Chief of Staff of Alachua General Hospital. He was predeceased by his wife of 63 years, Rachel. He is survived by his son Chip Emmel (Phyllis), daughter BarBee Geiger (Chuck), and son David Emmel (Lisa), along with eight grandchildren and nine great-grandchildren. In lieu of flowers, remembrances may be made to The First Presbyterian Church of Gainesville, Florida.

Mitchel P. Fearing, MD - (1954 - 2023)

Mitchel P. Fearing, MD passed away on December 4th, 2023. Dr. Fearing was born in Chattanooga, Tennessee in 1954. He received his Medical Degree from the University of South Florida and completed his Residency in Internal Medicine at the University of Miami Medical School - Jackson Memorial Hospital. Dr. Fearing began practicing in Winter Haven, Florida, later moving to Gainesville, Florida and setting up his practice in the City of Alachua. Dr. Fearing greeted every day with a smile and cared deeply for his family, friends, patients, and staff. He will be remembered for his kindness, dedication, and perseverance. He is survived by Pat Fearing and his children, Annmarie and Mitchell Fearing. In lieu of flowers the family asks that donations be made to NPR or the Humane Society.

Leonard T. Furlow, Jr., MD - (1930 - 2024)

Dr. Furlow passed away February 26th, 2024. He received his Medical Degree from Washington University in St. Louis, marrying Libby Truitt two weeks after graduation - which he said was the "best, most important thing I did in my life." He served Surgical Residencies at the University of Virginia, the University of North Carolina, and the University of Florida. Dr. Furlow joined the faculty at UF College of Medicine in the Plastic Surgery program, eventually focusing on cleft palate repair. Dr Furlow retired from active surgical practice in 1989, and began performing cleft palate surgeries in Honduras, Russia, Kenya, Venezuela and many other places for underprivileged patients. Leonard was predeceased by his wife Libby Furlow. He is survived by his sons Leonard and John and four granddaughters. In lieu of flowers, please make donations to the First United Methodist Church.

In Memoriam

Heather Hardcastle, MD - (1926 - 2024)

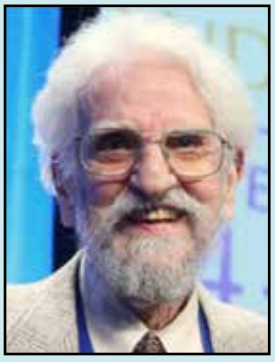
Heather S. Hardcastle, MD, passed away March 16, 2024. She was born in 1926 in Bombay, India, eventually leaving to pursue a degree in medicine in England. Dr. Hardcastle received her Medical Degree from the University of Leeds , West Yorkshire, England. She was Board Certified in Psychiatry and Neurology in the State of Florida, practicing psychiatry from 1973 to 2017.

Dr. Hardcastle was preceded in death by her husband of 53 years, Brian, and is survived by her two children, John (Lori) and Alison (Emory) and two grandchildren, Graham and Alexis.

Jack Londono, MD - (19?? - 2024)

Dr. Jack Londono was born in Caserta, Italy. He was educated in Colombia, South America, specializing in Endocrinology with a special interest in Diabetes Mellitus. He served on the faculty of several Universities, including the University of Michigan and Harvard University. He taught at the UF College of Medicine for several years before entering Private Practice in Gainesville. Dr. Londono had many other interests, including Real Estate Development. Jack and Nohra Londono were highly involved with the UF Performing Arts Center and were strong supporters of the Samuel P. Harn Museum of Art. He is survived by his wife of many years, Nohra, and by several children and grandchildren.

Arlan Rosenbloom, MD - (1935 - 2024)



Dr. Arlan Rosenbloom, former Professor of Pediatric Endocrinology at the University of Florida, died at home in Gainesville, Florida, on January 20, 2024, at the age of 89. He received his Medical Degree from the University of Wisconsin and practiced Endocrinology. He was drafted by the World Health Organization to be part of smallpox eradication in west Africa in '66 and hired by the University of Florida in 1968 to develop the Department of Pediatric Endocrinology, directing it for 50 years, while continuing his work internationally, with doctor exchange programs from Cuba and South America to Russia and Palestine, as well as dozens of other studies, research, and consulting, from New Orleans after Katrina, to the mountains of Ecuador. He is survived by his wife Edith, son Eric (Joanna Lake), and several grandchildren and great-grandchildren.

Buna Joe (B.J.) Wilder, MD - (1929 - 2023)

Dr. Wilder passed away on November 21, 2023. He received his Medical Degree from Duke University, Interning at Madigan Hospital in Tacoma, Washington, before serving as a Regimental Surgeon in the U.S. Army. He then completed a Surgical Residency at the University of Miami, followed by a Residency in Neurology at the University of Florida and a fellowship in Neurophysiology at Stanford University. Dr. Wilder then joined the University of Florida as a Professor of Neurology, centering his research on Epilepsy. He was Chief of Neurology at the Veterans Administration Hospital in Gainesville for 20 years. Dr. Wilder was predeceased by his wife Eve, and survived by his three children and several grandchildren and great-grandchildren. In lieu of flowers, contributions in memory of Buna Joe Wilder may be made to: The Fixel Institute Dementia Fund (#19243) at UF Health.

ACMS Board Highlights

Alachua County Medical Society - Board of Directors Meeting Minutes, April 11, 2023

Pursuant to notice, the Board of Directors of the Alachua County Medical Society met on Monday, April 11, 2023, virtually on Zoom.com.

We Care Report: Tony Campo, We Care Director, presented the annual results for the We Care Clinic discussing personnel resources, funding, healthcare services update upcoming initiatives. Ms. Diaz discussed with the Board the challenges facing the ongoing operation of free/subsidized clinics in the area.

Treasurer's Report: At Dr. Bruggeman's request, Ms. Owens presented the financial report:
Alachua County Medical Society, Inc. – a 501(c)6: Membership Dues have surpassed previous levels since 2020, totaling $79K for the 3 months under review. Publication and Events Income categories are increasing with current ACMS activities, resulting in Gross Profit of $87K for the First Quarter. Event Expense is mostly composed of the Poster Symposium scholarships and the upcoming Vendor Show, totaling $2.7K. Remaining expenses are in line with previous quarters, resulting in Net Income for the First Quarter of $61K.
Alachua County Medical Society Foundation, Inc. - a 501(c)3: The ACMS Foundation received Grant Income totaling $22.9K, with Grant Disbursements totaling $33.4K. Assets totaled $166K, with zero Liabilities.

President's Report: Dr. Dragstedt announced the nomination of Althea Tyndall-Smith for the incoming 2023-25 Secretary/Treasurer. The nomination was unanimously approved by the Board. In addition, Dr. Bruggeman has been appointed as Gator Caucus Chair at the Annual FMA Meeting, which was approved by the members of the Gator Caucus including Alachua, Brevard, Marion, Indian River, St. Lucie-Okeechobee, and Volusia counties. Dr. Charles Riggs requested an endorsement from the Board for his nomination as Board of Governors District H Representative. Dr. Levy motioned approval, seconded by Dr. Stechmiller, with the motion carried by the Board.

EVP Report: Ms. Owens reported on a request from We Care to hire 2 part-time employees through the Career Source of North Central Florida. These positions would be paid for by a Department of Labor Grant, at no cost to We Care. Dr. Levy motioned approval, seconded by Dr. Tyndall-Smith and approved by the Board.

Alachua County Medical Society - Board of Directors Meeting Minutes, May 9, 2023

Pursuant to notice, the Board of Directors of the Alachua County Medical Society met on Tuesday, May 9, 2023, virtually on Zoom.com.

Secretary Report: Dr. Bruggeman presented new membership requests as follows: Thomas Benton, MD; Kristin Dayton, MD; Carolyn Holland, MD; and Maureen Novak, MD. Following discussions, Dr. Riggs motioned to approve the new members, seconded by Dr. Levy.

Treasurer's Report: At Dr. Bruggeman's request, Ms. Owens presented the financial report:
Alachua County Medical Society, Inc. – a 501(c)6:
Membership Dues have returned to pre-covid levels for both UF and Private Practice Physicians, totaling $80K for the four months under review. Combined with Publication and Sponsorship Income, Gross Profit is $91.8K through April 30th. Event Expense of $6.3K increased over last year with the cost of the Poster Symposium scholarships and the Spring Social, as we have resumed in-person meetings. Publication Expense continues to decline, with all other expenses remaining in line with previous periods. Net Income through April was $50K.

Alachua County Medical Society Foundation, Inc. - a 501(c)3:
The ACMS Foundation received Grant Income totaling $22.9K, with Grant Disbursements totaling $51.74K. Assets totaled $147K, with zero Liabilities.
Dr. Levy motioned acceptance of the Treasurer's Report, seconded by Dr. Balamucki, and carried by the Board.

President's Report: Dr. Dragstedt facilitated a discussion regarding the current guidelines and procedures for selection of ACMS Delegates at the Annual FMA Meeting. After considerable debate, Dr. Ryan motioned that we table the item until a later date. Dr. Lucke-Wold seconded the motion, which was approved by the Board. UF Medical Student Representative Nicole Diaz presented a Resolution for consideration and submission to the FMA Meeting. Drs. Dragstedt, Balamucki and Bruggeman agreed to review the Resolution and recommend any revisions as necessary. The EVP will circulate the final Resolution to the Board for approval prior to the May 12th submission deadline.

EVP Report: Ms. Owens announced the ACMS Annual Meeting and Installation of Officers on May 16th and encouraged all Board members to attend. The upcoming FMA Meeting and deadlines were discussed. It was noted that the ACMS had a record number of Delegates this year with 20 physicians planning to attend.

ACMS Board Highlights

Alachua County Medical Society - Board of Directors Meeting Minutes, September 5, 2023

Pursuant to notice, the Board of Directors of the Alachua County Medical Society met on Monday, September 5, 2023, virtually on Zoom.com.

We Care Report: Ms. Owens presented the We Care Report in Tony Campo's absence. Tony Campo has officially retired from his position at We Care, with Melissa Laliberte being named as Program Manager. Tony's position as Director will not be filled at this time. The We Care report included the current personnel positions, funding sources, Dental Care updates and program initiatives for the upcoming year.

Secretary Report: Dr. Althea Tyndall-Smith presented new membership requests as follows: Paula Beers, MD; Colleen Koch, Dean, UF College of Medicine; Daven Doshi, MD; Marinette Gonzalez, MD; Sana Gulraiz, MD; Jameel Mohammed, MD; and John Rees, MD. Dr. Riggs motioned to approve the new members, seconded by Dr. Rosenberg, and carried by the Board.

Treasurer's Report: At Dr. Tyndall-Smith's request, Ms. Owens presented the financial report:
Alachua County Medical Society, Inc. – a 501(c)6: Membership Dues totaled $85.4K for the eight months under review. Combined with Publication and Activities Income, Gross Profit is $115.5K through August 31st. Expenses where in line with expectations and totaled $68.5K, resulting in Net Income of $46.9K.

Alachua County Medical Society Foundation, Inc. - a 501(c)3: The ACMS Foundation received Grant Income totaling $36.1K, with Grant Disbursements totaling $62.7K for the eight-month period. Assets totaled $127.7K, with zero Liabilities. Dr. Rosenberg motioned acceptance of the Treasurer's Report, seconded by Dr. Riggs, and carried by the Board.

President's Report: Dr. Balamucki discussed the results of the annual FMA meeting and noted that Dr. Bruggeman has been accepted into the FMA Leadership Academy. Dr. Riggs was congratulated on his election to the FMA Board of Governors as the District H Representative.

EVP Report: Ms. Owens discussed upcoming events and the Fall issue of House Calls magazine which highlights the incoming officers of the ACMS.

Alachua County Medical Society - Board of Directors Meeting Minutes, October 10, 2023

Pursuant to notice, the Board of Directors of the Alachua County Medical Society met on Tuesday, October 10, 2023, virtually on Zoom.com.

Member Request: Dr. Joseph Cauthen requested that a Committee be formed to consider the options available for the Robb House Medical Museum building and grounds. He and Dr. Mark Barrow would like to be appointed to this committee and given the authority to pursue options and report these discussions back to the Board for future consideration. Dr. Bruggeman moved approval of the request – pending Dr. Balamucki's approval (due to lack of a quorum) - which was seconded by Dr. Riggs and carried by the Board.

Treasurer's Report: At Dr. Tyndall-Smith's request, Ms. Owens presented the financial report:
Alachua County Medical Society, Inc. – a 501(c)6:
Membership Dues totaled $85.4K for the eight months under review. Combined with Publication and Activities Income, Gross Profit is $115.5K through August 31st. Expenses were in line with expectations and totaled $68.5K, resulting in Net Income of $46.9K.

Alachua County Medical Society Foundation, Inc. - a 501(c)3:
The ACMS Foundation received Grant Income totaling $36.1K, with Grant Disbursements totaling $62.7K for the eight month period. Assets totaled $127.7K, with zero Liabilities. Dr. Riggs motioned acceptance of the Treasurer's Report, seconded by Dr. Lucke-Wold, and carried by the Board.

President's Report: The request by Dr. Cauthen was discussed further with the consensus being that this may be an advantageous time to review our options. The EVP will send a letter to Dr. Cauthen of the approval of his request and determine the annual costs of maintaining the Robb House Medical Museum.

EVP Report: The 2024 ACMS Poster Symposium was announced with several Board members volunteering to Judge at the symposium. This year's event will be held at UF Professional Park on January 24th.

Ms. Owens discussed the We Care Grants that have been approved for the 2023-24 cycle and upcoming events.

ACMS Board Highlights

Alachua County Medical Society - Board of Directors Meeting Minutes, November 7, 2023

Pursuant to notice, the Board of Directors of the Alachua County Medical Society met on Monday, November 7, 2023, virtually on Zoom.com.

Treasurer's Report: At Dr. Balamucki's request, Ms. Owens presented the financial report:

Alachua County Medical Society, Inc. – a 501(c)6:
Membership Dues totaled $85.4K. Combined with Publication and Activities Income, Gross Profit is $130.4K through October 31st. Membership Dues for 2024 were received total $12.79K and are shown at the bottom of the ACMS Statement of Activities on a year-to-year comparison. Expenses were in line with expectations, totaling $88.8K, resulting in Net Income through October of $41.5K.

Alachua County Medical Society Foundation, Inc. - a 501(c)3: The ACMS Foundation received Grant Income totaling $113K, with Grant Disbursements totaling $94.2K for the ten-month period. Assets totaled $173.9K, with zero Liabilities.
Dr. Gillette motioned acceptance of the Treasurer's Report, seconded by Dr. Riggs, and carried, as Dr. Bruggeman concurred via email.

President's Report: Dr. Balamucki reported that Varsha Kurup, MD indicated that she would like to become a full Board Member as she recently graduated from her Residency program and has taken a permanent position at UF COM. This would fill the position vacated by Dr. Rizwanna Fareeduddin when she moved to Orlando last year. Dr. Gillette motioned approval of the request, seconded by Dr. Riggs, and carried, as Dr. Bruggeman concurred via email. Dr. Balamucki announced an upcoming Doctor of the Day opportunity in Tallahassee during the upcoming 2024 Legislative Session – January 9 through March 8th. All physicians interested should contact the EVP for an application and additional information. Dr. Riggs requested that the ACMS consider collecting Toys for Tots during the holiday season as a community outreach project. The Board agreed and asked the EVP to pursue the option.

EVP Report: Ms. Owens discussed the Annual Member Survey. The 2024 ACMS Poster Symposium was announced with several Board members volunteering to Judge at the symposium. This year's event will be held at UF Professional Park on January 24th.

Alachua County Medical Society - Board of Directors Meeting Minutes, January 9, 2024

Pursuant to notice, the Board of Directors of the Alachua County Medical Society met on Tuesday, January 9, 2024, virtually on Zoom.com.

Secretary's Report: Dr. Tyndall-Smith presented the following new members for approval: Thomas George, Jr., MD; with UF Health Cancer Center; Anne-Marie Slinger-Constant, MD; with UF Health Pediatrics. Dr. Rosenberg motioned approval, seconded by Dr. Tyndall-Smith and carried by the Board.

Treasurer's Report: At Dr. Tyndall-Smith's request, Ms. Owens presented the financial report:
Alachua County Medical Society, Inc. – a 501(c)6: Membership Dues for 2023 totaled $85.4K. Activities Income (Sponsorships and Vendor Show income) totaled $15.7K, an increase of 62% over 2022 as the ACMS resumed in-person meetings. Combined with Publication and Other Income, Gross Profit was $131.7K. Expenses were in line with expectations, totaling $117.1K, resulting in Income in Excess of Expenses (Net Income) for the year of $14.7K.

Alachua County Medical Society Foundation, Inc. - a 501(c)3:
The ACMS Foundation received Grant Income totaling $113K, with Grant Disbursements totaling $107.5K for 2023. Assets totaled $160.5K, with zero Liabilities.
Dr. Lucke-Wold motioned acceptance of the Treasurer's Report, seconded by Bruggeman, and carried.

President's Report: Dr. Balamucki summarized the Toys for Tots campaign in December as we collected 47 toys and $650 donations towards the cause. The Toys for Tots program reported that overall, they collected over 15,000 toys, serving over 4000 children in Alachua, Dixie, Levy and Gilchrist counties, thanking all of those who participated this year. The ACMS was one of over 150 collection centers in the area.

EVP Report: Ms. Owens reported that additional Judges were needed for the Poster Symposium for Wednesday evening the 24th and to refer any colleagues who might want to be involved. Dr. Riggs mentioned that we should ask the FMA President to talk at an upcoming ACMS Meeting and possible dates that may work for Dr. Goldman. The EVP agreed to see if he would be available.

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