THE AMERICAN ACADEMY
OF
CARDIOVASCULAR PERFUSION
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Summer 2025

The Academy Newsletter

Message from the AACP President

Memorial Day has finally come, and we are officially into the summer months. In celebration, most of us will be hanging out by a body of water, camping in the wilderness or doing some sort of entertaining adventure with family and friends. It is the time of the year we try to relax and enjoy life. As we embark on our summer holiday time, I would like each of us to think about why we do what we do every day when it pertains to our professional career.

It is important to reflect during your life in that, no matter where you are in your career, whether it be as a student, a new associate, a seasoned perfusionist or someone nearing retirement, self-reflection can confirm our professional purpose and maintain passion going forward into your career. A constant reminder of our purpose and passion for our profession will help get us through the hard days at work or rough times in our career journey.

Allison Weinberg, last year's Academy President, touched upon the concept of "Finding Your Why" in her Wharton Lecture. She explained that finding your "why" will help center your focus in life and help drive us to be our best. The motivational speaker Simon Sinek has further highlighted this concept in several of his presentations, when he explains that experiences in your life develop your "why" and that these experiences drive your passion towards your professional career. During your time of self-reflection, think about your "why" and then use this as your motivation during daily professional responsibilities.

Inside this issue

The members of the Academy and my colleagues at Children's Hospital of Philadelphia know me as a person that enjoys being part of the Academy, bringing about changes that further advance our profession, but also wearing a select costume for each year's Sponsors' Workshop. As a long-time member of the Academy, I have had the opportunity to serve this organization on many levels, whether it being one of the founders of the student society, a council member, leading the sponsorship committee, providing lectures or moderating sessions. My continued involvement in the Academy, not only as a registered member but also as an active participant, has guided me in maintaining my professional purpose. The Academy has helped me find part my professional "why." This next year, the message of the Academy and my presidency will be focused on passion for this profession, career and life.

This summer, while you are sitting on the sand, by a campfire or waiting in line for your favorite roller coaster, take the time to think about "why" you chose this profession and understand "why" you have passion for this profession. I encourage each of you to also allow the Academy to be an avenue to find your professional purpose in the clinical realm, in academia or in industry. The Academy is not just a very reputable perfusion organization, but it is a community that allows an individual to express their passion and devotion to the future of our profession. If you are not an Academy member, I welcome you to join our organization. If you are a current member: thank you; we appreciate you being a part of our community. If you are a member and do not have an active role in the Academy, then I urge you to please consider having more active involvement, whether it be on a committee, providing a lecture or moderating a session.

Please enjoy your time with your loved ones this summer, have some great adventures, but please take the time to self-reflect, think about your "why" and focus on your passion for our profession. We look forward to seeing each of you in St. Petersburg, FL in February 2026!

Richard W. Melchior , MPS, CCP, FPP, FACCP
AACP President

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The full manuscript of this article has been submitted to the journal Perfusion for possible publication.

Exploring Cell Free DNA As A Biomarker For Evaluating Cardioplegia Efficacy

Cell free DNA (cfDNA) is highly fragmented, double-stranded DNA that has been released into the bloodstream. Low physiological levels result from routine cellular apoptosis, while elevated levels are associated with pathophysiological conditions. Cellular injury and hypoxia can result in cellular necrosis and release of cfDNA through neutrophil extracellular traps. This pathophysiological release of cfDNA activates both the intrinsic and extrinsic coagulation pathways, triggering platelet activation. Additionally, cfDNA functions as a damage-associated molecular pattern, contributing to the initiation of systemic inflammatory response syndrome. Given its active role in cardiovascular health, cfDNA has recently been explored as a new biomarker for cardiovascular disease progression. It exhibits both rapid peak plasma concentration and clearance from systemic circulation, making it highly sensitive to changes in patient health. Elevated cfDNA levels have been closely linked to myocardial tissue damage, particularly in heart failure and myocardial infarction (MI). Studies have shown that cfDNA levels increase in patients suffering from MI, peaking after percutaneous coronary intervention before returning to baseline within 24 hours. While elevated cfDNA levels indicate cardiomyocyte injury, they also reflect successful reperfusion, as ischemia-induced cfDNA is washed out of the coronaries into systemic circulation. Cardiopulmonary bypass surgery inherently introduces a period of myocardial ischemia, exacerbating the release of cfDNA and increasing the risk of reperfusion injury. These negative ischemic effects are mitigated through the use of cardioplegia by preserving myocardial tissue and reducing metabolic demand. This provides an opportunity for a novel and quantitative approach to evaluating the efficacy of cardioplegia. By comparing baseline cfDNA concentrations with those obtained immediately after aortic cross-clamp removal, lower peak cfDNA levels may indicate more effective myocardial protection. Use of cfDNA as a biomarker has the potential to optimize myocardial preservation strategies in cardiac surgery.

Call For Abstracts

Have you or a colleague been working on a project in the field of Perfusion?

Would you like to share this exciting work with the Perfusion community and possibly get it published in the *Perfusion* journal?

The deadline for abstract submission for the 47th Annual Seminar of the AACP is **October 15th, 2025**. Please submit your abstract to office@theAACP.com using the Abstract Submission Form available on the AACP website.

Griffin Cronk
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I earned my Bachelor's Degree in Criminology from Florida State University in 2011, after which I proudly served six years in the U.S. Army Infantry. Following my honorable separation from the military, I continued my commitment to public service as a patrol officer with the Houston Police Department, serving the South-Central Houston community for four years.

It was during my time as a police officer that I was introduced to the field of perfusion by a close family friend. From the moment I observed my first procedure in the operating room, I was captivated. The level of discipline, precision, and teamwork among the surgical team immediately resonated with the values I had embraced during my time in the Army. That experience ignited a new calling in me and I knew I would do whatever it took to become a perfusionist.

Spontaneous Coronary Artery Dissection

Spontaneous coronary artery dissection (SCAD) has shifted in recent years from an obscure curiosity to a well-recognized, distinct cause of acute coronary syndrome. In the perfusion community, this diagnosis commands attention because it undermines the very coronary perfusion the perfusionist strives to support and, in rare but dramatic cases, it forces rapid deployment of cardiopulmonary bypass (CPB) or extracorporeal membrane oxygenation (ECMO). This essay reviews epidemiology, pathophysiology, clinical presentation, contemporary management, and most centrally, the specific considerations for perfusionists who may be drawn into the care of patients with SCAD. This discussion brings together what we currently know and highlights some of the key research questions that are starting to gain attention in extracorporeal science.

Although population registries still underestimate prevalence, prospective angiographic studies suggest SCAD accounts for between one and four percent of all acute coronary syndromes and up to one-third of myocardial infarctions in women younger than fifty years of age (Pender et al., 2025). The fact that SCAD often affects younger women without typical risk factors for atherosclerosis continues to challenge frontline clinicians, who may mistakenly attribute their chest pain to less serious causes. Heightened awareness, however, has revealed that predisposing conditions such as fibromuscular dysplasia, peripartum hormonal shifts, connective-tissue disorders, and severe emotional or physical stress, create an environment in which the coronary media can abruptly weaken. Perfusionists should appreciate that many of these associations also carry vascular fragility elsewhere in the body causing an issue when selecting arterial cannulation sites for CPB or ECMO.

Pathophysiological, SCAD involves separation of the coronary arterial wall layers by either an intimal tear that admits blood into a false lumen or by spontaneous bleeding from the vasa vasorum that forms an intramural hematoma. Both mechanisms narrow the true lumen, impairing flow and causing ischemia. Optical coherence tomography and intravascular ultrasound have demonstrated that intramural hematoma without an obvious intimal breach predominates (Dang et al., 2024). This is important for perfusionists because aggressively altering systemic blood pressure or coronary flow during bypass could potentially worsen or extend the hematoma. Furthermore, because iatrogenic dissection during diagnostic catheterization can extend the false lumen, operators often rely on conservative imaging such as coronary computed-tomography angiography in hemodynamically stable patients (Lorenzatti & Gongora, 2025).

Driven by that inspiration, I returned to college to begin the next chapter of my journey. I am now a dedicated perfusion student at The Texas Heart Institute, deeply grateful for the opportunity to continue serving others through this vital and life-sustaining work.

Clinically, SCAD typically presents as non-atherosclerotic ST-elevation or non-ST-elevation myocardial infarction with chest pain of sudden onset. Ventricular arrhythmias and cardiogenic shock are less common but remain in the scenarios that most frequently involve the perfusion team. A striking case series of left-main SCAD described resuscitated cardiac arrest, rapid hemodynamic collapse, and the need for percutaneous ventricular assist devices followed by emergency VA-ECMO at a community hospital (Ya'Qoub et al., 2024). Such reports reinforce the importance of perfusionists' readiness to prime an ECMO circuit, manage anticoagulation swiftly, and provide portable oxygenation support outside the operating room.

Management strategies depend on lesion location, coronary flow, and patient stability. Consensus guidelines from both the American Heart Association and the European Society of Cardiology advocate conservative medical therapy when coronary flow is preserved, because most dissections heal spontaneously within weeks (Aziz, 2017). Beta-blockade and antiplatelet therapy dominate the pharmacological approach, though optimal antithrombotic regimens remain under study (Crousillat et al., 2024). When blood flow is critically reduced or left-main involvement threatens large myocardial territories, revascularization is inevitable but also burdened with higher technical failure rates than atherosclerotic disease. In the Vancouver cohort, technical failure during percutaneous coronary intervention (PCI) reached thirty-six percent, with emergency conversion to CABG required in twelve percent (Hayes et al., 2018). For perfusionists, these statistics translate into a heightened probability that a "simple" acute coronary syndrome patient may suddenly appear for urgent bypass under suboptimal preoperative conditions.

Coronary artery bypass grafting in SCAD introduces several perfusion challenges. First, arterial dissection may extend proximally, so aortic cannulation must avoid fragile segments visualized either through angiography or intra-operatively. Some surgeons may favor femoral cannulation so that CPB can be rapidly instituted in patients who are hemodynamically unstable. Yet, if fibromuscular dysplasia or other systemic arteriopathies are present, that should prompt a peripheral vessel duplex assessment beforehand. Moreover, protecting the heart muscle may require administering cold-blood multidose cardioplegia through both antegrade and retrograde routes. This is done so that compromised lumens can be safely navigated. Indeed, a recent case of extensive multivessel SCAD required an extended coronary arteriotomy and long saphenous vein patch reconstruction prior to grafting. This prolonged cross-clamp time and demanded meticulous delivery of oxygen and management of temperature on the part of the perfusionist (O'Sullivan et al., 2023). Additionally, there's a heightened risk of postoperative bleeding, particularly when dual antiplatelet therapy is started before the patient's exact pathology is known, combined with the fragile condition of the dissected vessel. For this reason, cell-salvage techniques and targeted hemostatic transfusion protocols should be prepared in advance.

Extracorporeal membrane oxygenation offers a bridge for patients in profound cardiogenic shock or those experiencing recurrent ventricular arrhythmias unresponsive to pharmacotherapy. While data remain limited to case reports, ECMO survival in SCAD appears comparable to other causes of shock when instituted promptly (Ya'Qoub et al., 2024). Perfusionists need to balance the requirements for systemic anticoagulation with the potential risk of intramural hematoma growth. Recent findings indicate that using low-dose heparin techniques or bivalirudin might reduce bleeding risks while maintaining circuit functionality, yet there are no prospective studies available. Because SCAD is relatively rare, developing robust ECMO protocols in this setting will likely depend on data from multicenter registries to ensure quality and reliability.

Prognostically, in-hospital mortality is low—around one percent in pooled analyses—yet recurrence and extension of dissection are clinically relevant, occurring in roughly three to ten percent of patients over three years (Dang et al., 2024). For perfusionists, awareness of recurrence risk informs long-term follow-up when these patients return for unrelated cardiac procedures. Aggressive manipulation of the aorta or coronary ostia should be avoided, and pre-operative imaging reassessment is imperative even years after the initial event. Quality of life studies reveal that persistent anxiety about recurrence can limit physical activity; a factor teams should address during cardiac rehabilitation.

Research priorities intersect with perfusion in several domains. First, genetic studies are probing connective-tissue pathways that might predict vessel fragility. Integrating such data could one day guide perfusion cannulation decisions. Second, the specific hemodynamic conditions that lead to the spread of the false lumen during bypass surgery are still not clearly understood. Advanced lab-based flow models that mimic both pulsatile and non-pulsatile perfusion could help identify safe pressure limits. Third, using medications like intravenous beta-blockers in the pump prime to reduce shear stress is a strategy that should be studied more vigorously. The 2024 JACC (Journal of the American College of Cardiology) Advances call for coordinated research networks underscores these gaps and invites allied professionals, including perfusionists, to participate in multicenter protocols (Crousillat et al., 2024).

From an educational standpoint, perfusion curriculum should increasingly incorporate SCAD scenarios into simulation training. Traditional perfusion education revolves around atherosclerotic coronary disease, yet SCAD demands complex strategies such as lower perfusion pressures to curb dissection dissemination, heightened vigilance for arrhythmia during initiation and weaning, and flexibility with cannulation techniques. Likewise, multidisciplinary collaboration is essential. Perfusionists must communicate with interventional cardiologists about coronary imaging findings, confer with cardiac surgeons regarding grafting plans, and liaise with intensivists when considering ECMO.

In conclusion, spontaneous coronary artery dissection challenges clinicians by masquerading as routine acute coronary syndrome yet possessing distinct epidemiology, mechanisms, and management pitfalls. Mastering SCAD requires an appreciation of delicate coronary architecture, an understanding of when and how to support circulation mechanically, and a recognition of the evolving evidence base that guides therapy. As research fills current knowledge gaps, perfusionists will remain pivotal in translating physiological principles into safe, patient-centered support strategies for this unique and increasingly recognized cardiovascular emergency.

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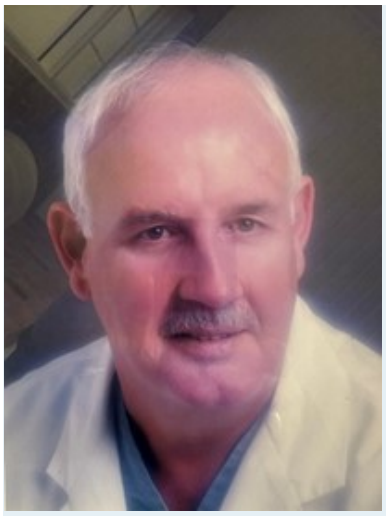

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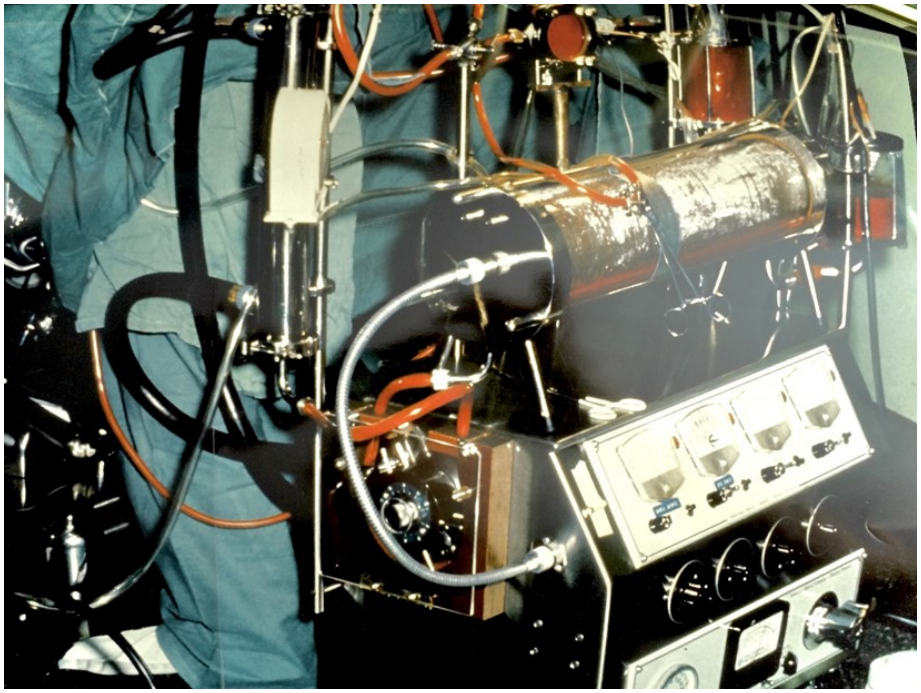
The Evolution Of Extracorporeal Circuit Component Change

Henry David Thoreau had written in his journal: "how vain it is to sit down to write when you have not stood up to live". This quote emphasizes the importance of experience and action over just mere writing! Given these past several decades of direct clinical experience and action interface, as a Cardiovascular Perfusionist (CP), and having trained during the initial integration of both Cardiopulmonary Bypass (CPB) and our bloodless open heart surgical interface, as shown in the below enclosed photo, I respectfully sit down to write from my personal several decades of direct cardiac involvement and related clinical experience.

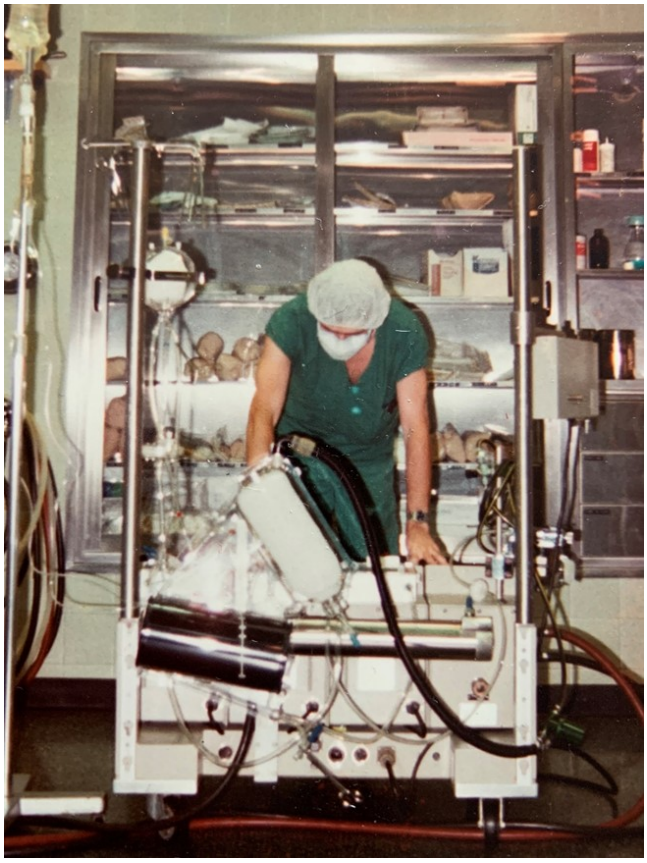


The Kay Cross Rotating Disc Oxygenator & The American Optical Heart Lung Machine with incorporated Venous Reservoir, Venous Settling Chamber, Gross Arterial Line Screen Filter and Brown Harrison Stainless Steel Heat Exchanger, The Victoria General Hospital, Halifax, Nova Scotia, 1968

Within this experience, and my retirement, I continue to read Perfusion related literature and, as such, am encouraged by the many articles written by our younger generation of CP via student publications within the Academy Newsletters, also inclusive of our recent Perfusion school graduates! Reflective within such published literature would be their individual investigation in respect to the scientific delivery of appropriate CPB and Evidence Based Perfusion Practice (EBPP) given our ever evolving extracorporeal circulation (ECC) specific component interface. Such publications would continue to positively impact the im-

mediate care of our present cardiac patient population! Given such literature publications, the phrase "tides nor time wait for no man" would serve as a subtle reminder of my initial, witnessed, past era of inconvertible CPB component change. To this present day, we continue to proceed towards a scientific approach given our recognized associated pathophysiology of CPB. As such we might be wise, given the passage of time, to revisit our historical and influential extracorporeal past! The Spanish philosopher, George Santayana said, "he who does not remember the past is condemned to repeat it". From time to time one might give consideration to revisiting our past ECC history to acknowledge those influential and historical step by step lessons as they would pertain to the initial introduction and future evolution of such extracorporeal component change, having initial taken place, out of shear clinical NECESSITY! Giving my career had begun in the late 1960's, readers of this Academy Newsletter might give thought to the pivotal realization that every single ECC component, that you would utilize during your daily conduct of routine CPB, would have a singular and unique evolutionary history! Within such realization, the reader is provided with the pivotal historical linkage towards our understanding in regards our initial ECC development - a development having been born out of the historical remnants of our much earlier, but essential, ECC circuit interface history, as shown in the reality of the above 1968 photo. Any subsequent CPB component changes would eventually grow out of the influential interfacing, within our future Cardiopulmonary Companies, towards the much safer and more reliable commercially available CPB component interface of this present day! Within this pending cooperative reality, the earlier associated open-heart era of undesirable, but related, morbidity and mortality, would be positively impacted! The soon to be recognized extracorporeal associated pathophysiology of CPB sequelae was to have its related genesis by way of scientific studies beginning in the 1980 years. These CPB component changes would eventually be brought to the forefront towards future acceptable and establishing standards of Perfusion related best practices! That said past clinical influencers are deserving of specific reference to our historical past and, as such, several can be found within our Academy Newsletters. Perfusion colleagues, such as Kelly Hedlund, CCP Emeritus, have taken a comprehensive look back into several earlier era initial and historical Heart Lung Machine (HLM) and Pump Oxygenator (PO) component evolution, many of which, I had personally used throughout my career. In an interesting contrast, it is duly noted, today's latest iteration of modern day HLM computer-based integration might ultimately serve to remove the necessity for any such elective extracorporeal component change given their incorporated extracorporeal component integration? Within this realization, the necessity and evolution for past ECC component change has served to provide the fertile soil in which the evolution of the present day commercially available extracorporeal armamentarium continues to be realized. The desired result being a much safer and clinically reliable CPB armamentarium interface, being provided to our cardiac surgical patients, to the present day!

Having taken a peak into the necessity given our past ECC component experiences, the objective of this article is to review challenges that may be presented to the modern-day open-heart team via the, sometimes not readily appreciated words, "change"! Within our intended focus, ECC change can be described as a general transition, given a substituted component change, within a proposed improvement in CPB-related care? It is noteworthy, given the safer introduction of commercially available CPB components, as shown in the below 1970's picture, the development of the art of Perfusion would, slowly, begun to find its associated scientific interface given the gradual realization of a much safer, more dependable disposable CPB related technological interface.



The author & The Baxter Bentley Disposable Hard Shell Bubble Oxygenator, Cardiotomy Reservoir, the new Sarns "Modular" HLM and Stainless Steel Torpedo Heat Exchanger, The Victoria General Hospital, Halifax, Nova Scotia, 1973

Within these previous and ongoing eras of evolving clinical interface and, past realization, we had successfully spanned several "very influential decades" into today's modern CPB clinical reality!

Specific to elective ECC component change, the decision to proceed towards any proposed commercial available CPB component improvement, can be considered a daunting task? Adding to the possible uncertainty of change is the expectation to further document any such elective component change given our established EBPP present day professional milieu? In addition, the possible clinical scenario might be, "if it ain't broke, why fix it" and/or "why embrace any elective component change if our patients appear to be doing well"? Such a proposed reality might serve to predispose individual stakeholders to discourage any organized, step-by-step attempt, towards a cooperative integrated team approach, in regards any anticipated component change? In addition, institutional monetary concerns might serve to further frustrate any motivation towards any such commercially available, CPB incorporated, technology change?

I have personally experienced the several decades of the clinical span from the initial necessity towards elective, but beneficial, ECC component change. One is referred to the phrase, "going from knowing to doing", as mentioned by Bob Baker, Donald Likosky, Kenny Shann, et al. Given that reality, how then might one proceed, in regards the philosophical theory of extracorporeal component change, towards constructive discussion pending any potential clinical evaluation and possible future component change? Within that reality, elective component change would require a thorough literature review in alignment within the established scope of EBPP, i.e, a prospective or retrospective analysis of specific elective ECC component change thus being encouraged. Given that clinical scenario, such potential ECC component change, and/or previous negative experience, may predispose team individuals to an associated fear in participating in any CPB related protocol, given personal preferences, experiences and possible human bias? A smaller cardiac

team, with limited cardiac team stakeholders, might allow for an easier embrace of any such elective component change? In addition, any thought towards elective ECC component change could be further negatively influenced, independent of cardiac team size, given the possibility of a hierarchical clinical environment?

Within any of these possible clinical scenarios, thus presented, there has been a personal collage of historical clinical component experiences that has served to have shaped my understanding of structured extracorporeal technological interventional change. One important but salient point in regards the concept of ECC component change might bear revisiting, that being, all stakeholders should embrace any such agreed upon component change! On a personal note, I had participated in a particular myocardial preservation strategy change albeit the one individual NOT being interested in participating in any such organized change, had become its overall champion, thus, human indifference and personal bias being realized into a renewed clinical acceptance reality! Within any organized team agreement the word compromise would have no place in the daily milieu of one's open-heart surgical reality given the overall objective, of all cardiac team stakeholders, being the proposed scientific oriented improvement in cardiac patient specific and specialized extracorporeal associated care! Within the focus to introduce, hopefully to optimize and to scientifically document overall cardiac patient care improvement, below is a time tested proven incremental step by step approach and/or recipe to "specific proposed elective component change", within your established daily CPB armamentarium?

An overall cardiac team stakeholder's agreement the time had come to proceed, from the philosophical theory of change, to the final clinical decision-making being directed towards a specific clinical investigative ECC component change.

- Ensure the investigation of published scientific literature and EBPP that may assist and/or support the cardiac team stakeholders in their investigation prior to any pending component change?
- The ability to liaison with Perfusion colleagues (👍) who had previously bridged this specific component change from the theory to the realization of the actual CPB component change reality.
- Provide a margin of clinical self-comfort, during any observational site visit, that would be "shared" with all team members!
- The majority of team members, and other stakeholders, i.e, administration if applicable, should be involved in the final decision to move forewords by way of constructive and shared decision making.
- It is beneficial to have a staff member, or two, to be in charge of the structuring of your investigative component change and may not, necessarily, have to be the Perfusion team leader.
- Thorough input and discussion with ALL stakeholders within the cardiac team, must be inclusive of both the associated Anestheologists and the Cardiac Surgeons!
- Should team consensus be reached, it is beneficial to have at least one or two Cardiac Surgeons involved given any such proposed clinical evaluation and elective component change!
- Should your elective component evaluation become an incorporated CPB component change you have then, successfully, progressed from the philosophical theory of component change into the successful integration within your specific CPB, daily, Best Practices!
- Lastly, given a particular institutional accountability and possible EBPP approach, a randomized control trail (RCT) should be considered to scientifically support any such CPB component change and should, therefore, be published and shared within the Perfusion community at large, thus allowing unbiased interpretation and open discussion by Perfusionists colleagues!

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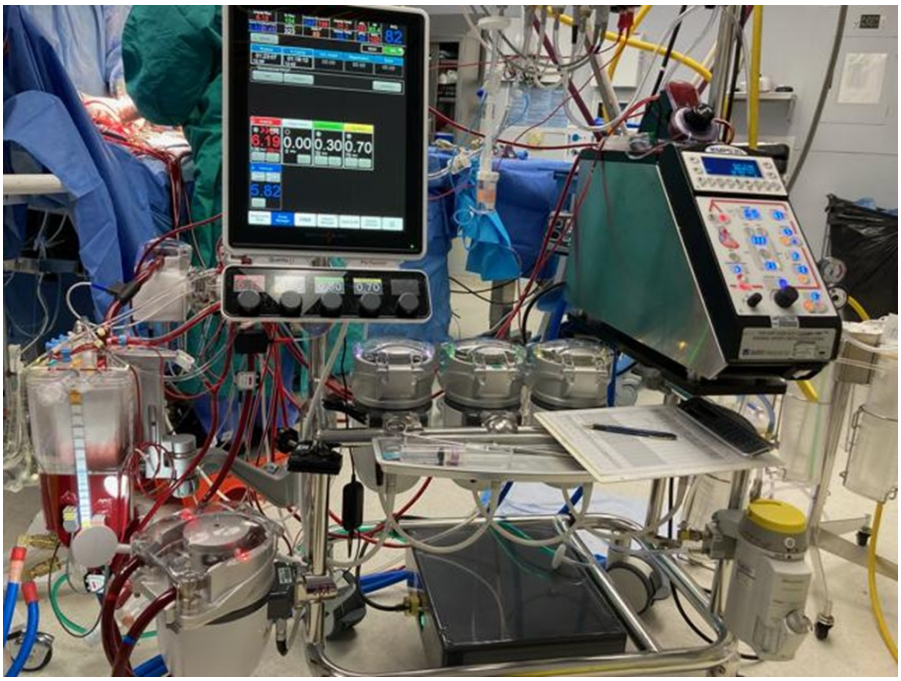

The Spectrum Medical Quantum Modular Perfusion System, QE 2 Hospital, Halifax Infirmary Site, Halifax, Nova Scotia, March, 2025 - courtesy of Roger Stanzel, CPC, MSc, PhD, Perfusion Team Lead, Dept of Cardiovascular Perfusion, Halifax, Nova Scotia, Canada

Justin List
School of Perfusion Technology
The Texas Heart Institute
Houston, TX

I am a dedicated perfusion student at The Texas Heart Institute with a strong clinical foundation as a licensed respiratory therapist and ECMO specialist. With extensive experience in both ground and air transport, I have served as a pediatric flight respiratory therapist, providing critical care to neonatal and pediatric patients in high-acuity settings. Passionate about advancing cardiopulmonary support technologies, I look forward to bringing my unique perspective to perfusion through a multidisciplinary background and a commitment to excellence in patient care.

Atrioventricular Groove Disruption in Patients with Mitral Annular Calcification: Surgical Challenges and Management Strategies

Abstract

Background: Atrioventricular (AV) groove disruption is a catastrophic complication most commonly occurring during mitral valve surgery, particularly in patients with severe mitral annular calcification (MAC). MAC complicates annular integrity and increases the technical challenge of mitral valve replacement.

Methods: This paper reviews the pathophysiological mechanisms, risk factors, clinical manifestations, and surgical strategies associated with AV groove disruption in the setting of MAC, with an emphasis on preventive approaches and intraoperative decision-making.

Results: The literature indicates that extensive MAC, particularly when involving the posterior annulus, significantly increases the risk of annular dehiscence, left ventricular rupture, and fatal AV groove disruption. Prevention centers on conservative calcium debridement and annular reconstruction using biological or synthetic patches.

Conclusions: In patients with MAC, meticulous preoperative planning, intraoperative vigilance, and individualized surgical strategies are essential to prevent AV groove disruption and optimize outcomes.

Introduction

Mitral annular calcification (MAC) is a chronic, degenerative process that affects the fibrous skeleton of the mitral valve, predominantly the posterior annulus. While often clinically silent, severe MAC poses major surgical challenges during mitral valve replacement (MVR), particularly due to its distortion of the normal annular geometry and calcific encroachment into the left ventricular myocardium.

Atrioventricular (AV) groove disruption is one of the most devastating intraoperative complications during MVR in the setting of MAC. It is associated with abrupt hemodynamic collapse, uncontrollable bleeding, and high perioperative mortality. This review explores the anatomical interplay between MAC and AV groove vulnerability, risk mitigation strategies, and current surgical approaches to repair and prevention.

Pathophysiology and Anatomy

The AV groove marks the interface between the left atrium and the left ventricle and anatomically encompasses the coronary sinus, posterior mitral annulus, and circumflex coronary artery. In patients with MAC, the posterior annulus becomes stiff, brittle, and tightly fused to surrounding myocardium.

Aggressive decalcification can damage the underlying myocardium or create a cleavage plane into the AV groove, leading to rupture. Furthermore, anchoring prosthetic sutures into heavily calcified or weakened annular tissue increases the risk of dehiscence or tearing during pressurization.

Risk Factors

Several factors increase the risk of AV groove disruption in MAC patients:

- Extent and distribution of MAC (posterior > anterior annulus involvement)
- Elderly age (tissue fragility)
- Female sex (smaller annular dimensions)
- Chronic kidney disease (accelerated valvular calcification)
- Prior cardiac surgery
- Infective endocarditis or radiation heart disease

CT imaging can preoperatively quantify MAC severity and help assess annular dimensions and proximity to coronary vessels.

Intraoperative Presentation and Diagnosis

AV groove disruption typically presents acutely during or shortly after cardiopulmonary bypass (CPB) weaning:

- Sudden hypotension
- Extensive bleeding in the posterior left atrial field
- Cardiac tamponade
- Transesophageal echocardiography (TEE): Pericardial effusion, wall motion abnormalities, or abnormal valve motion

Delayed presentations are rare but can occur postoperatively with tamponade or massive hemopericardium.

Surgical Management

Prevention

- Partial or conservative debridement: Avoid complete removal of calcified tissue if unnecessary.
- Annular reconstruction: Use of bovine pericardium, Dacron, or PTFE patches to recreate a safe suture zone.
- Supravalvular implantation: Positioning the prosthesis slightly above the annulus to avoid deep suturing into the calcified region.
- Patch-enforced repair: The “Utrecht technique” involves posterior annular patching to bridge defects and prevent AV groove tension.

Management of Rupture

- Immediate institution of CPB
- Patch repair of the groove using synthetic material or autologous pericardium
- Left atrial to ventricular bypass grafting in inoperable rupture cases

Outcomes improve with rapid identification and prompt surgical correction, but mortality remains high.

Discussion

Patients with MAC represent a surgical challenge not only due to the technical complexity but also the profound implications of AV groove disruption. While complete calcium resection allows for better prosthetic fit, it must be balanced against the risk of structural compromise.

Emerging alternatives such as transcatheter valve-in-MAC (ViMAC) procedures offer non-surgical options for high-risk patients, though data remain limited. Ultimately, successful outcomes depend on individualized operative planning, surgical expertise, and institutional experience.

Conclusion

AV groove disruption in the setting of MAC remains a rare but fatal complication of mitral valve surgery. Identifying high-risk patients, applying preventive intraoperative techniques, and utilizing annular reconstruction when necessary are critical steps in reducing morbidity and mortality. Advanced imaging, surgical planning, and intraoperative judgment form the cornerstone of safe mitral interventions in this complex patient population.

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47th Annual Seminar of
The American Academy of Cardiovascular Perfusion
Hilton St. Petersburg Bayfront
333 1st Street S St. Petersburg FL 33701
February 4-7th, 2026

Wednesday, February 4th, 2026

1:00 pm – 5:00 pm	REGISTRATION
2:30 pm – 5:00 pm	**Manufacturers' Breakout Rooms**
5:00 pm – 5:30 pm	Opening Business Meeting *Fellow, Member, Senior, and Honorary Members*
5:30 pm – 7:00 pm	**Special Scientific Panel Session – Pro/Con Debates**

Thursday, February 5th, 2026

7:00 am – 10:00 am	REGISTRATION
7:00 am – 7:45 am	Historical Video Presentation and Breakfast
7:45 am – 9:30 am	**Special Scientific Panel Session – Adult Congenital Surgery**
9:30 am – 11:30 am	**Fireside Chats**
11:30 am – 12:30 pm	Lunch (Historical Presentations)
12:30 pm – 2:30 pm	**Special Scientific Panel Session – Healthcare Economics and Quality Improvement**
2:30 pm – 3:00 pm	Historical Presentation and Break
3:00 pm - 5:00 pm	**Scientific Paper Session**
5:30 pm – 8:30 pm	**Sponsor's Hands-On Workshop & Reception**

Friday, February 6th, 2026

7:00 am – 10:00 am	REGISTRATION
7:00 am – 7:45 am	Historical Video Presentation and Breakfast
7:45 am – 9:30 am	**Special Scientific Panel Session – NRP and Transplantation**
9:30 am – 11:30 am	**Fireside Chats**
11:30 am – 1:00 pm	Historical Video Presentation and Lunch
1:00 pm – 2:45 pm	**Special Scientific Panel Session – Pediatrics**
2:45 pm – 3:15 pm	Historical Video Presentation and Break

3:15 pm – 5:00 pm	**Memorial Session** *Introduction* *Charles C. Reed Memorial Lecture* *Thomas G. Wharton Memorial Lecture*
6:30 pm	**Induction Dinner** *All Attendees and Guests (pre-registration required)*

Saturday, February 7th, 2026

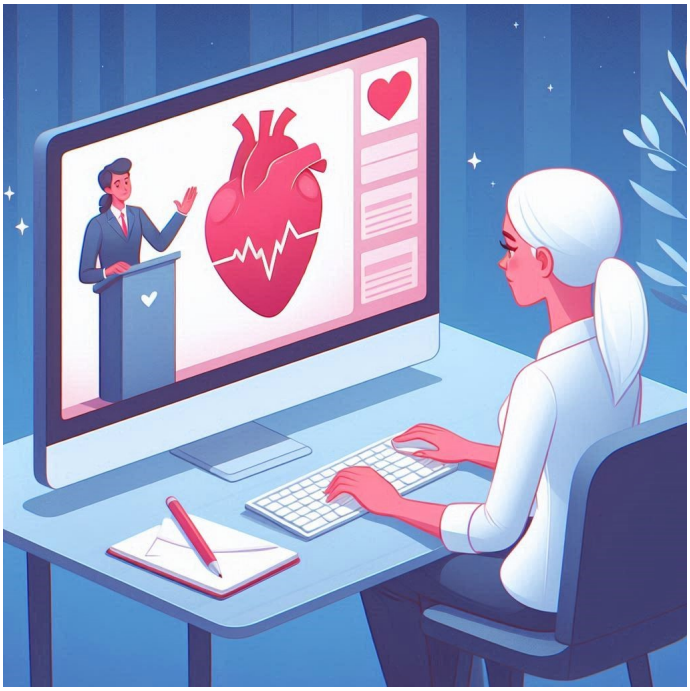
7:00 am – 10:00 am	REGISTRATION
7:00 am – 8:00 am	Historical Video Presentation and Breakfast
8:00 am – 10:00 am	**Scientific Paper Session**
10:00 am –12:00 pm	**Fireside Chats**
12:00 pm	Closing Business Meeting *Fellow, Senior, and Honorary Members Only*

Live Webcast of the AACP Conference

The AACP will be offering a Live Webcast of the 2026 Annual Seminar in St. Petersburg, FL.

Virtual attendees will be able to stream all of the General Sessions, as well as have two virtual Fireside Chats each day, exclusively for virtual attendees, ensuring qualification for Category I CEUs.

Virtual attendees will have the opportunity to again ask questions of the moderators,



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Important Academy Dates

The ACADEMY ANNUAL MEETING DEADLINES

ABSTRACT DEADLINE	**October 15, 2025**
MEMBERSHIP DEADLINE	**December 3, 2025**
PRE-REGISTRATION	**January 10, 2026**
HOTEL REGISTRATION	**January 10, 2026**
2025 ANNUAL MEETING	**February 4-7, 2026**

2026 Annual Meeting

St. Petersburg, Florida
February 4-7, 2026

Our Host Hotel

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Remember to mention that you will be attending the Annual Conference of The American Academy of Cardiovascular Perfusion (AACP).

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