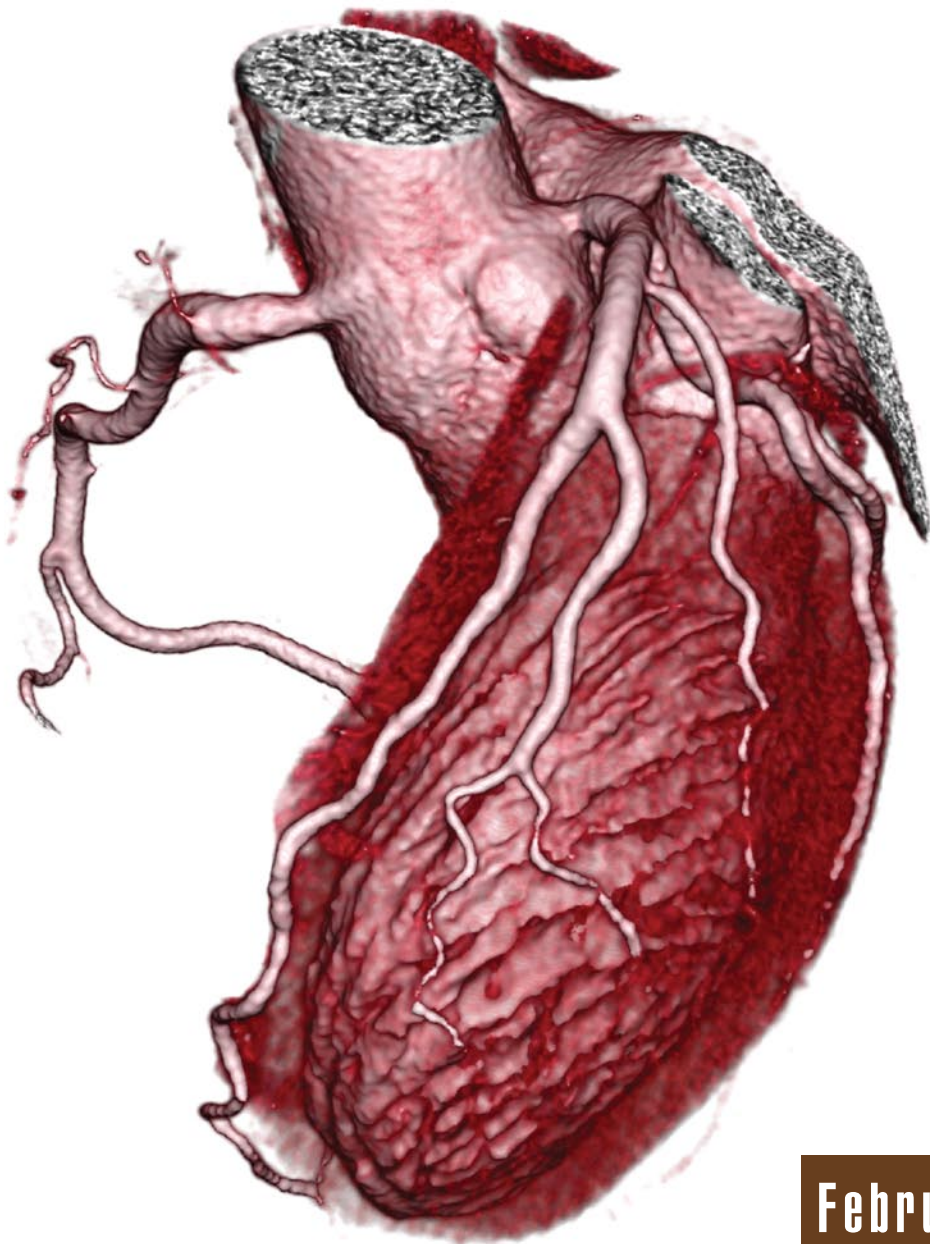


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Clinical Advancements IN CARDIOVASCULAR IMAGING

Building a Successful CTA Practice



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Steps to Building a Successful Cardiovascular CTA Practice

Sixty four-slice cardiac CT is undoubtedly one of the most significant medical advancements in recent years, with the potential to revolutionize cardiac care. Its clinical implications are being researched and debated by leading physicians who envision coronary CT angiography (CCTA) as the next “gold standard” for measuring coronary artery stenosis – potentially replacing the more invasive catheter-based angiography.

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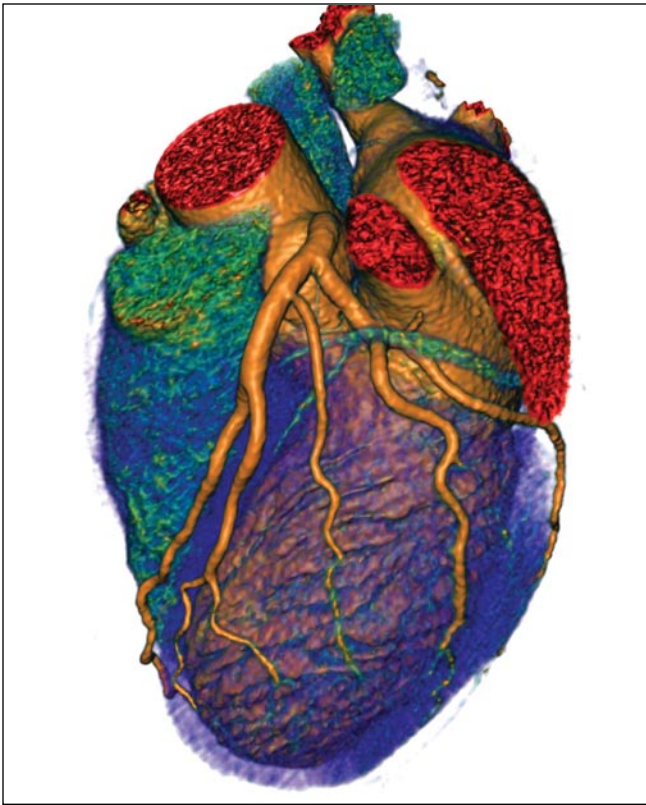
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Not surprisingly, increasing numbers of cardiovascular practices across the country are now offering the latest coronary CTA and diagnostic imaging services.

While the immediate clinical and patient benefits of implementing a cardiac CT practice are increasingly clear, numerous other factors, including business models, ROI and the decision-making process involved in adopting such an advanced technology, require careful consideration.

This article will closely examine the clinical and business factors involved in building a successful cardiovascular CTA practice, and offer practical steps for implementation. I made the decision to start a cardiac CT program 5 years ago because I saw the potential of the technology and the value of cardiac CT for patients. I believed then, and still believe now, that this technology will change the paradigm of how we diagnose and treat cardiovascular disease. As an interventional cardiologist, I will share my perspective and reflect on some of the factors and decisions that led to the creation of a successful CV imaging center and teaching program.



3DVR acquired using 0.5mm slice thickness and ^{SURE}Cardio software on Aquilion 64 CFX.

Step One: A Business Model to Match

Developing an appropriate business model is critical to success. This model must take into account the size of the practice, its location and associated regulatory requirements, as well as the ownership structure. Keep in mind that numerous local healthcare regulations may become an obstacle if not appropriately addressed in the beginning. One needs to determine the business and partnership structure and whether it complies with the Stark Law – the statute that governs referral of Medicare and Medicaid patients – or if it will exist as an independent testing facility. In either case, the preferred model must stipulate how the practice will optimize its clinical care and patient load.

An often under appreciated but extremely important factor in creating a successful center is developing a realistic and effective marketing plan. You will need to consider who your target market is, how you will reach them, whether your center will depend on referrals from physicians only and which physicians you need to target. In our experience it is not cardiologists but primary care physicians who generate the majority of referrals. Some imaging centers hire a full or part-time marketing representative to call on their referral base while others market directly to the public. This is most

BUSINESS MODEL FACTORS

Who are the equity holders?

If multiple groups or specialties are going to be partners, there are restrictions on self-referral and limited ways to structure the partnership.

Will the CT equipment be part of your practice?

You need to decide whether it will be onsite at your practice or be an independent testing facility (IDTF).

What is your planned mix of cardiac, vascular and non-vascular exams?

It is important to try and get accurate estimates on the volume of procedures you plan to generate and include the mix of cardiac, vascular and non-vascular depending on your referral base and partner structure.

Decide who your target market is and how you will reach them.

Decide whether your center will depend on referrals from physicians only and what physicians you need to target. At most centers it is not Cardiologists but primary care physicians that generate the most referrals. In some communities the imaging center hires a full or part-time marketing rep to call on its referral base. Some centers market to the public. That is most common with coronary calcium scoring. If you plan to do any marketing you will need to make sure to budget for it.

Analyze who else is in your market.

Are there other competing physician groups with CT scanners or groups that might jump in? Are there hospitals that have scanners or might purchase one in the near future?

Figure out what your primary goals are in the business.

Common reasons to start a center:

1. Interest in offering cutting edge care.
2. Competitive advantage against a rival group or hospital.
3. Additional sources of revenue for your practice.
4. Desire to create new markets for your practice such as peripheral vascular disease.

common with coronary calcium scoring. If you plan to do any marketing, make sure to budget for it. Lastly, you need to analyze your competition and whether there are competing physician groups with CT scanners, hospitals that have scanners or facilities which might purchase them in the near future.

Step Two: Meeting Financial Requirements

Starting a coronary CTA practice is a capital-intensive endeavor. For clinical physicians lacking financial planning experience, the upfront and ongoing

operating costs associated with a cardiac CT can seem overwhelming. With that in mind, any realistic financial model must account for the sheer volume of patients and procedures expected.

Operating a cardiovascular CT involves higher fixed overhead costs than many other modalities, such as a nuclear camera or ultrasound. This overhead cost remains constant whether the practice performs one scan a day or 50. Moreover, the upcoming implementation of the Deficit Reduction Act is expected to significantly reduce Medicare reimbursements for outpatient imaging procedures, and must be considered.

Despite these financial challenges, a successful cardiovascular CTA practice is possible with sound financial planning and a strategy which takes into account the estimated ratio of cardiac, vascular and other imaging studies to be performed at the practice. In today's reimbursement environment, most industry experts estimate that a cardiac-only practice needs to perform between six and seven studies per day just to break even. In some cases, a personal or corporate guarantee might be necessary to finance the equipment necessary to operate the practice (e.g., cardiac CT, PACS and 3D viewing workstation) – which can result in additional personal financial risk.

ESTIMATES OF HOW MANY CARDIOVASCULAR PROCEDURES YOUR PRACTICE MAY GENERATE

Stress tests:	15-20%
Diagnostic caths:	20%
New cardiology consultations:	20%
New peripheral vascular consults:	30-35%

Step Three: Forging Mutually Beneficial Vendor Relationships

Building mutually beneficial vendor relationships is also crucial. Certainly, your most valuable relationship is with your CT vendor. In addition to directing you to the best equipment and pricing, a CT vendor may provide financing options, long-term service contracts and build-out supervision. Equally important is the vendor's ability to offer post-sale support such as marketing and on-site training. As a cardiologist, I was very concerned about purchasing the equipment that would allow the best

plaque imaging. I was especially interested in: getting the best low-contrast resolution (ability to determine slight differences in shades of gray), the thinnest slices (the highest spatial resolution), and a fast temporal resolution which is a combination of the gantry rotation speed and an adaptive multisegment reconstruction. I would highly recommend spending time with each of the vendors, so that you understand the technical specifications of each machine. In addition, make sure you understand the post-sale support you will receive from your vendor, as it is crucial in building your business.

Selecting a 3D viewing workstation vendor is also essential. For the reading physician, the workstation is one of the key equipment decisions because it dictates access, workflow and report generation. I would highly recommend arranging to have a day to work on different workstations that interest you to get a very good sense of the features and workflow abilities of each system.

IMPORTANT QUESTIONS TO ASK YOUR CT VENDOR

What is the business model that you think would work best for our practice?

What kind of financing options are there and what kind of guarantees are required in our situation?

What are the details of the build-out supervision you provide?

Once the CT is installed what training is included for the technologist?

What training is available for the physicians and can that be included in the price quote?

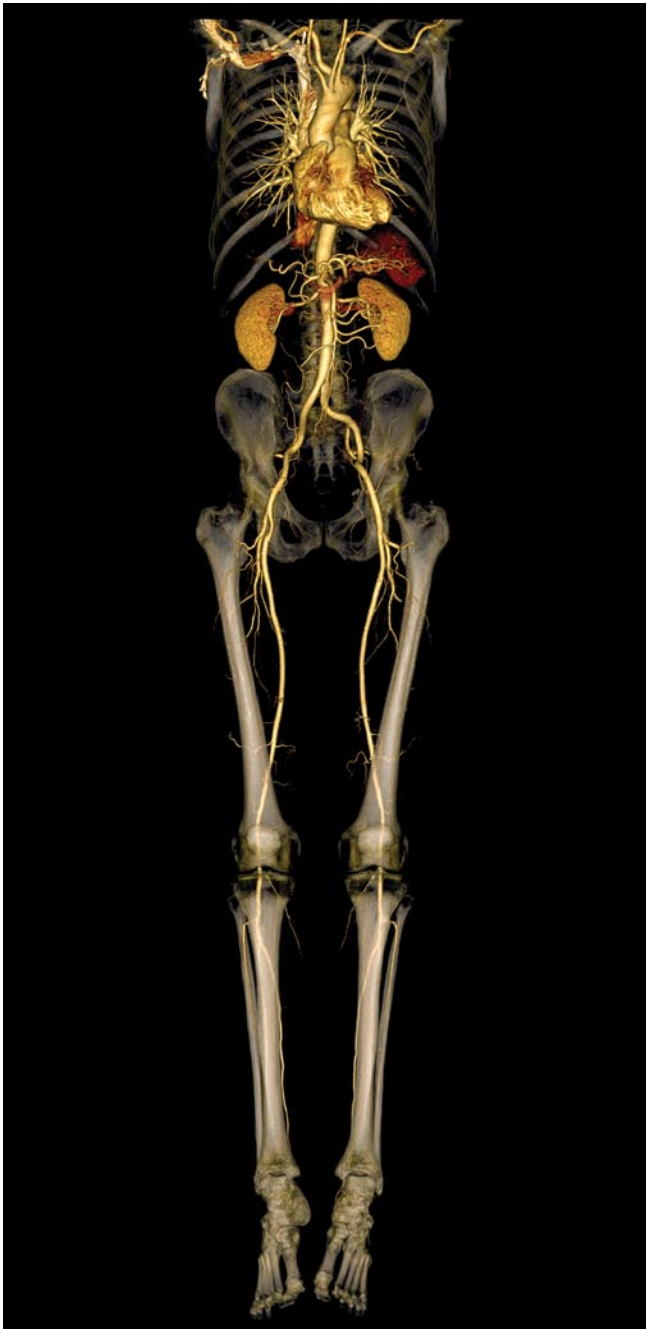
What are the details of the post-sale support that you offer in terms of marketing assistance, business assistance?

How does your equipment differ from your competitors' equipment? Things to consider are slice thickness, low contrast resolution, temporal resolution, and true number of detectors.

Can the workstation be bundled into the sale even if it is not the CT vendor's product?

Step Four: Site Planning and Build-out

Once the business model and vendor relationships have been developed, site planning and build-out are the next



3DVR aorta and runoff. 0.5mm full body isotropic resolution.

Step Five: Finding the Right People for the Job

Finding trained technologists and clinical support personnel qualified to perform coronary CTAs can be challenging and costly. One approach is to hire a technologist with general CT experience and then add the necessary cardiac CT skills through on-the-job training. Keep in mind that most CT vendors provide one to two weeks of on-site or off-site applications training as part of their CT post-sale support package. There are also numerous cardiac-specific training programs available (also known as *supertech* programs).

Physicians reading coronary CTAs need specialized training and must meet specific competency guidelines published by governing associations such as the American College of Cardiology Foundation, American Heart Association, and American College of Radiology. Training can take significant time and expense depending on the number of physicians who require training.

Since referring physicians supply the practice with its patients, they are among the most important groups for educational enrichment. They need to understand the strengths and weaknesses of this new technology and develop a thorough understanding of the clinical indications involved in selecting patients for coronary CTA. Getting out and giving talks, plus preparing educational material for referring physicians are essential elements. An experienced CT equipment vendor will be of immense help in this area.

Step Six: Third Party Payor Credentialing

Determining whether insurance carriers can add coronary CTA services to existing contracts is essential. Since it often takes a significant amount of time to implement contract coverage changes, practitioners are advised to initiate these discussions as early as possible. The third-party payors will most likely want copies of your cardiac CT competency certificates so you need to plan your training early.

Step Seven: Keep IT and Informatics Top of Mind

One of the most under appreciated areas of building a successful practice is planning the IT and informatics infrastructure. If the practice is considering remote sites, bandwidth issues may impact the images and data that are transferred. In this case you will also need a 3D workstation solution that allows remote login and access to image processing. A variety of storage and archive technology options must be explored, especially in light of the capabilities of reading and referring physicians using the system.

issues since costs among vendors vary significantly. In most cases, the CT vendor will assign a site planner to aid the process. A contractor with relevant image center development experience is also necessary to oversee the project. Special attention should be paid to site designs that optimize workflow and patient throughput, as they will greatly impact the practice's overall productivity.

Given the number of building permits and contractual requirements, it may take as long as six months before the imaging practice is operational.

Step Eight: Designing Technical and Clinical Protocols

Creating a technical system for the acquisition and reconstruction of coronary CTA images is important to ensure proper clinical workflow and timely reporting. Many of the acquisition protocols are programmed into today's sophisticated CT systems. However, there are special patient cases that require consideration such as obese patients, patients with bypass surgery or others who require dedicated protocols.

Post-image processing is also an essential part of the process. Without standardized protocols, the specific reconstructions performed by technicians are center-dependent; in the end, it may simply come down to the reading physician's preferences. We have developed specific post-processing algorithms that suit our needs for the evaluation of the coronary arteries, functional cardiac data, and reading physician requirements.

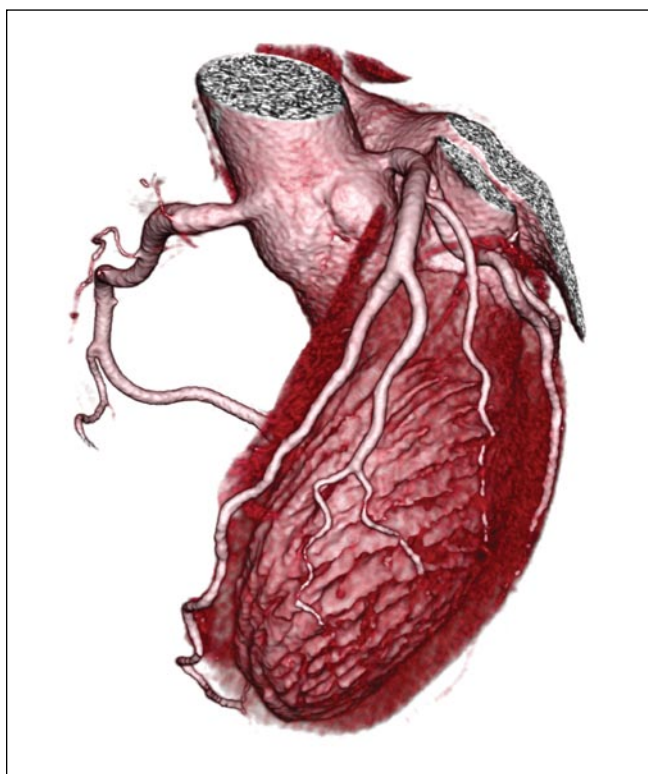
Obviously, the creation of systems, forms and policies can go a long way toward ensuring the highest-quality clinical care and optimal patient flow. CT practice owners are advised to comprehensively consider the full spectrum of pre-scan, intra-scan and post-scan issues that may arise, including lab screening requirements, restrictions against Glucophage and related medications, high-risk patient identification and poor patient exclusion (e.g., those suffering from atrial fibrillation or contraindications to beta-blockers).

Of course, having protocols in place for emergencies, contrast reactions, contrast extravasations or other complications is important. Each site should have complete ACLS-trained personnel and a crash cart outfitted with a defibrillator.

Step Nine: Report Generation

Once the coronary CTA data is obtained and reconstructed, it is sent to a 3D workstation for post-processing. Physicians who have been trained to read the studies can then review and interpret the data and generate a final patient study report.

Decisions on how this report will be archived, retrieved and sent out to referring physicians must be addressed. The reporting system must deliver high-quality images and reports in a timely fashion – often as soon as 1-2 hours, but within 24 hours after the data is processed – to get results to the referring physicians.



3DVR after the right ventricle has been segmented to visualize the right coronary artery.

Bringing it All Together

Starting a coronary CTA practice is a significant undertaking with multiple moving parts, systems that need to be designed and important decisions that need to be made. An efficient center must be able to generate enough referrals and maintain patient volume to pay overhead and yield profit. As noted earlier this is a high fixed overhead business, so careful planning and accurate projections on volume, the types of procedures you will do and the average reimbursement amount is essential to know.

At this time, healthcare imaging reimbursement, laws and requirements are moving targets. Business models must be flexible enough to deal with sudden changes in reimbursement policy, equity and partnerships models, competition and other unforeseen, potentially volatile events.

In the end, opening an coronary CTA imaging practice need not be a overwhelming proposition. By combining the considerations above with contingency plans, systems and strategies for the unexpected, a growing number of practices are finding financial success and delivering top-quality patient care to create an entirely new benchmark for success. **CA**