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By Astrid Fiano

# DOTmed Industry Sector Report: Contrast Injectors

**M**any facets of the medical equipment industry are the “standards” that plug along without fanfare, in the shadow of equipment superstars. Contrast injector systems—the machines that introduce contrast dye materials into a patient’s system for CT, MRI or angioplasty diagnosis—are a good example of such a standard. Contrast injectors have been in use for decades, supporting the growing use of imaging in medicine and offering a steady if unsung market. Manufacturers such as GE, MEDRAD, Liebel Flarsheim, Bracco/ACIST (formerly EZEM) and Swiss Medical Care, have all been working to improve technology and patient safety for their injector products.

Contrast injectors comprise about ten to fifteen percent of sales and service business for the company Integrity Medical in Ft. Myers, FL. Mr. David Denholtz, CEO, finds the sales for the injectors to hospitals and medical centers to be growing in increments nationally and also growing internationally—not spectacularly but still providing reliable revenue. Denholtz says that pre-owned injectors cost around \$3000 to \$8000 dollars, and may save a facility 40 to 60 percent compared to new equipment.

Mr. Carlos Sanchez, broker for ION, LLC in Mission, TX says about 80% of his business (in Texas and Mexico) deals with the sales of pre-owned contrast injectors to hospitals and independent medical centers, with the typical price range for pre-owned equipment to be \$5,000 to \$15,000, offering a savings of at least 50% compared to buying new. Scott Scofield, Chief Executive Officer of Vivid Imaging in Las Vegas, NV, offers new and pre-owned equipment costing \$1,500 to \$21,000. ViVid sells and services internationally to hospitals, standalone imaging centers and occasionally research labs.

### **Maintenance of the machines—no crying over spilled contrast**

One of the biggest concerns for facilities using contrast injectors is the life cycle of a machine. Denholtz and Sanchez esti-

mate a well-maintained contrast injector system can last at least three to five years. If a machine is very well-maintained, they may even last 10 to 15 years.

Scofield explains the vagaries of the machines: “In the past, earlier models of the equipment were real workhorses, a combination of being both mechanically and software-driven. While safety has improved in the newer models, in the older models a failure was easy to take care of in-house.”

Sanchez strives hard for ION’s services to stand out in the market. “I try to provide the best quality injector for the price,” Sanchez explains, and that means carefully inspecting the machines for the

major mechanical problem with the systems—leakage of the contrasting agent. “[The agent affects] the cosmetic appearance and the functioning of the injectors, the boards—the computerized part. Leakage can even affect the pistons, because the contrast leaks in and gets hardened.”

Vivid’s service calls handle a host of operator errors: some drastic, others not so much, and many involve spilled contrast. “You can seal and seal all you want,” Scofield says, “but it will infiltrate into the motor or a board, and most people are using the machines in a hurry. When you get into a site it might be completely caked in contrast.” Further damage occurs in trying to clean



**Medrad’s Spectris Solaris MR Injection System**

the contrast by soaking the unit with water, causing more infiltration, rather than using a damp cloth. "Power surges are another issue," Scofield continues. Spikes and brownouts can also cause major problems, but manufacturers are taking steps such as incorporating built-in surge protectors.

What else goes wrong with contrast injectors? "The heating elements fails, or injection speed flow gets out of whack and needs to be calibrated," Denholtz says. In the process of refurbishing, Denholtz states that the machine needs to be completely disassembled. "It needs to be recalibrated, the heating units tested and replaced, basically the system goes through a regular calibration that would be performed at a hospital shortly before usage."

Vivid will become ISO Certified in October. "For us," Scofield notes, "when we talk about refurbishing, we like to put our name behind the quality following the process, not just cleaning

it out and it's good to go. We use OEM or OPM parts only, and back it up with a one-year warranty."

### Technology and innovation create new markets for injectors

"It is the changes in technology—the same changes that make equipment obsolete or create innovations that contribute to the life of a machine," Scofield says. "OEMs, and rightfully so, are moving software calibration and maintenance. The systems now need an interface, which takes away from the end user performing service on the systems. The potential problems develop from the computer-related issues of power surges, or contrast infiltration into the electronic system. This causes more of an event. The new software-driven equipment is more costly, but it is the natural phase with any technology."

Sanchez says the problems facing the U.S. economy have naturally had an

effect on the contrast injector market, resulting in about 20% fewer sales. The medical facilities process fewer patients and therefore have less of a budget to work with. "There has been some local downward effect in terms of acquisition [of equipment]," Scofield agrees.

However, the experts in the industry feel the technology and expansion of the uses for contrast injectors will have the market soon looking up. A sign of the evolution in technology is the move into dual-head injectors and the expanded market for injectors. "MR injections have increased in popularity, the market used to just be CT and angio," Denholtz notes. The most important technological advance has been the dual flow, which means a technician can mix the contrast with saline for enhancement of a certain area. Currently, the dual-head is mostly used for cardiac diagnosis. Sanchez sees the market as still pretty stable, and the equipment will continue to sell well due to the need for CT and cardiac usage in general as a diagnostic tool, especially with the dual being used more often. Dual-head and multi-head injectors allow for lower pressure, less contrast agent and reduce the waste of contrast.

Scofield also sees expansion as the key factor that points to a better market in the future: "There have been questions about the safety of the contrasting agents which are injected into the patient for illumination of soft tissue. Foreign items in the body always raise questions. But the expansion of the CT market has led to introducing saline into the injector, which delivers a tighter bolus in the body, opens the vein up faster, and helps clean out of the kidneys faster. Everyone is trending to the dual-head injector, and that is creating the new market. We can use a procedure with a 130 ml of contrast or even 100 or 80, with better imagery, and more use for cardiac patients. Everyone is changing over to saline," says Scofield.

Another advance in the market, Scofield points out, is the use of a coronary CTA instead of a coronary angiogram. The CTA uses an iodine-containing contrast dye, making the procedure safer for younger or geriatric patients as it causes less pressure and is less invasive. In addition, it offers a better



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Name	Company - Domestic	City	State	Certified	DM100
<b>David Denholtz</b>	<b>Integrity Medical</b>	<b>Fort Meyers</b>	<b>FL</b>	●	●
Dennis Giuzio	Mobile Radiology, Inc.	New Port Richey	FL		
Patrick Miles	Medical Imaging Resources Inc.	AGAWAM	MA	●	
<b>Jeff Rogers</b>	<b>Medical Imaging Resources Inc.</b>	<b>Ann Arbor</b>	<b>MI</b>		●
Carlos Sanchez	Ion, L.L.C.	Mission	TX		
<b>Scott Scofield</b>	<b>Vivid Imaging</b>	<b>New Port News</b>	<b>VA</b>		

image on the heart with a blending or dilution of contrast at a specific time. People look for efficiency in injectors; a lot of time is spent loading a syringe. The Nemoto line allows a technician to hand-fill the injectors in advance, improving patient set up. Scofield says, "Loading away from the head speeds time and reduces the need for repairs."

### Safety issues remain the primary concern

The systems have not really changed much in terms of safety for the patient, although OEMs are continually working on improvements to avoid the primary concerns: air bubbles, extravasations and tracking of the contrast. Air bubbles are usually determined by loss of pressure. While air bubbles are rare, they can still occur so manufacturers are working on improving detection. ViVid is distributor for Swiss Medical's CT Exprés III, equipped with air detectors to prevent any risk of air injection into the patient. The cassette-based closed system, without syringes, also limits the pressure needed to inject into the patient.

Scofield feels within the next couple of years, preventing extravasation will be a selling point and that more studies will advance mixing and dilution of contrast for better and safer effect.

Another driving force in the industry is how to contain and monitor contrast. Large containers of contrast are often used; where does the leftover agent go and how does it stay secure? Scofield explains there is a demand for smaller bottles that can be completed with one use—log the lot number and be disposed. Prefilled syringes may also be a solution for accountability.

Industry insiders such as Scofield believe the future lies in integrating the injector system with the CT. These type of systems, known as CAN (controller area network) open, will allow the CT itself to program when to start the infusion into the patient, when to finish, analyze the contrast viscosity, know what procedure to perform and the best method to perform it, and so on. An integrated system will improve synchronization, accuracy of the timing, and greatly simplify the technician's job. Major manufacturers continue to develop an integrated system. MEDRAD has already intro-

duced its Stellant CT Injection System, featuring the DualFlow simultaneous injection and scanner-injector interface technology, as well as two new additions: CardiacFlow powered by P3TTM and XDSTM Extravagation Detector.

As with so many areas of the imaging industry, the market can only expect more growth with the aging baby-boomer demographic and their continuing demand for more sophisticated care. This means contrast injector systems will continue to be the sidekick to the imaging superheroes.

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