

St. Mary's serves as demonstration site for new technology

By Kevin Myers

Pioneering the most advanced system in the country, St. Mary's Hospital has become the national demonstration site for a new vascular diagnosis procedure.

The hospital is equipped with the first biplane digital subtraction angiography (DSA) system in the country, enabling it to provide the most advanced artery and vascular examinations in the nation, officials say. As a result, Rochester residents are part of a new wave of patients receiving outpatient angiography diagnosis.

Just two weeks ago, St. Mary's added a cardiac component to the DSA system, also becoming one of the first in the country to offer DSA examinations for patients with heart-related complications.

The main advantages of the DSA system are that it saves patients' money, provides increased patient comfort and convenience, and presents less risk to patients than that presented by most current angiography procedures, according to Dr. Thomas Stevenson, director of the vascular procedure room at St. Mary's and a leading expert in angiography.

Tests that recently required a three-day stay in the hospital and a substantial amount of discomfort, now are offered as lower-risk outpatient angiography services, costing far less money.

According to Stephenson, patients examined in the new lab are usually released from the hospital's ambulatory center about an hour and a half after admission. With typical

hospital costs at \$350 a day, a \$150 ambulatory center charge is significantly less expensive than the previous three-day room charge.

Angiography is the process of studying blood vessels, traditionally by means of X-rays. In a typical angiogram, dye is injected into the patient's arteries or organs in the body, and the patient is then X-rayed. The X-ray image can indicate such conditions as vascular constriction throughout the body, Stephenson said.

Subtraction angiography is a new computerized process that provides much clearer images and allows physicians to more easily examine specific arteries and organs. As the dye is injected into an artery or organ, the computer image is displayed on a video monitor. The digitized system divides the image into more than 250,000 segments, similar to the dot pattern in newspaper or magazine photographs. The subtraction aspect of the system highlights those segments showing dyed areas and fades-out segments of the image that are not needed.

"The idea is to get rid of unwanted images such as ribs and other organs," said Don Mattoon, special procedures technician. Mattoon said the system also allows technicians to adjust the image contrast, thus reducing the frequency of repeat injections due to poor image quality.

The diameter of the catheters required to inject dye when using the DSA system is only half the size of that required in the past. "We used to have to run a much larger catheter

through the major artery in the groin, all the way up to the organ we were examining," Stephenson said. When examining the heart, "We had to run the tube through the heart ventricle and into the chamber of the heart, and then take regular X-rays." The smaller catheters allow intravenous insertion and significantly limit risks of arterial sclerosis and other forms of arterial damage from the process.

Although digital subtraction angiography systems have been operated by a small number of U.S. hospitals for more than a decade, it wasn't until October, 1984, when St. Mary's instituted its new system, that the biplane feature was offered to the general public. Using only one dye injection, the biplane DSA system simultaneously can provide two different views of one element or single-view images of two separate organs — cutting in half the amount of toxic dye needed in previously used digital X-ray procedures.

The system was installed at the Rochester hospital as part of an agreement with Philips Medical Systems of Shelton, Connecticut. Dr. Thomas Stephenson, director of the vascular procedures laboratory at St. Mary's Hospital, initiated the program as a joint effort between the DSA manufacturers and the hospital. "As part of the deal," Stephenson said, "the Philips Company uses the facility as a test center and a showroom." Photographers, medical journalists and doctors from all over the country visit the laboratory to observe the new techniques.

But the equipment was not installed at St. Mary's without an extensive search by the Philips Company. Stephenson's expertise and excellent track record in the field of angiology were a definite motive in the company's decision to locate the facility at the Rochester hospital. Stephenson is director of seminars at St. Mary's Hospital, creator of the Annual Cruise Seminar on Diagnostic Imaging and has published several articles on radiology.

As compensation for its cooperation with Philips, St. Mary's was required to pay for only one of two digital units it received in the \$1.2 million DSA package. Fluoroscopy, biplane digital photography and biplane radiology are some of the exclusive capabilities provided by the system.

The added cardiac package was purchased by the hospital in October, as part of the hospital's \$40 million renovation project. Stephenson hopes to purchase additional components for the DSA system this year with proceeds of the annual Seton ball, November 23, at the Rochester Plaza Hotel, will benefit the cardiology department.

"Ninety percent of the time," Stephenson said, "we use this new system for evaluating stroke patients ... checking for narrowing of the arteries in the neck." The intravenous injections are frequently used in conjunction with the DSA system to detect arteriosclerotic disease (hardening of the arteries) in the carotid arteries in the neck, and may indicate the need for surgical correction to prevent strokes. Other applications requiring only intravenous injection include studies of the arteries to the legs, kidney and renal arteries, and examination of the aorta and heart.

Often, physical symptoms are caused by arterial conditions that initially seem unrelated. In the case of a local man, an intravenous DSA revealed the kidneys as the causal site of high blood pressure. Arterial sclerosis restricted the flow of blood to the left kidney. As a result, the kidney released a hormone to heighten the body's blood pressure. Because the kidney was severely deteriorated, implanting a shunt to increase blood flow would have been ineffective. Doctors decided to remove the damaged kidney to stop the hormone secretions, thus reducing the blood pressure.

Brain tumor and aneurism detection by intra-arterial angiography are the second most commonly practiced tests facilitated by the DSA system. "Ninety-five percent of our intra-arterial angiography procedures are used when checking for aneurisms or tumors in the brain or tumors in the liver," Stephenson said.

The new cardiac component can produce 30 clear images per second, enabling the cardiac biplane DSA system to be used extensively for heart research. This represents a dramatic improvement from the two-image-per-second capacity of older equipment that limited DSA angiography procedures to relatively motionless anatomy. Applying the computerization component of the DSA system to cardiac angiography simplifies quantitative analysis of cardiac functions.

Stephenson is currently researching the use of a specially designed pigtail catheter, allowing intra-arterial coronary arteriography that does not require insertion of the catheter directly into the coronary artery.



Dr. Stephenson patiently talks over a procedure with patient Cecil Wright.

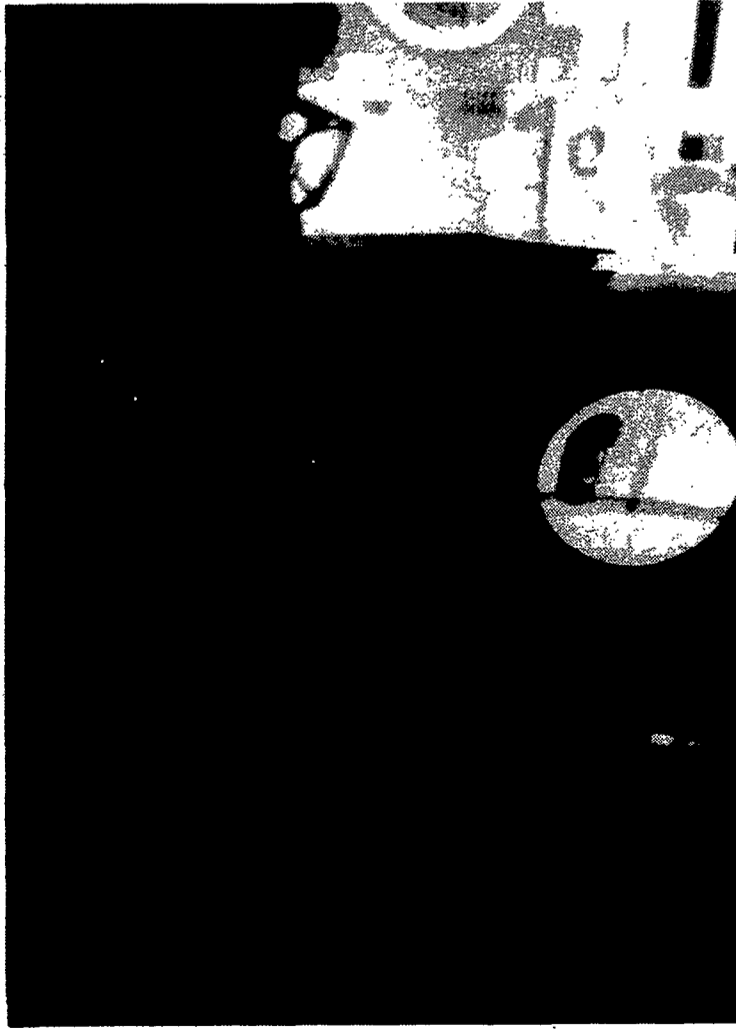


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As Dr. Stephenson inserts the catheter, special procedure technicians Don Mattoon and Joan Baker stand ready to assist. The monitor shows dye moving through the patient's blood vessels.



Just prior to the procedure, Dr. Stephenson numbs the injection site with an anesthetic.



Watching the video monitor, Dr. Stephenson observes constriction of the arteries leading to the left kidney.