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**News Highlights from April's *Journal of Vascular and Interventional Radiology***

**New Study Shows Three Clot Dissolving Drugs Used in Minimally Invasive Treatment of Deep Vein Thrombosis Are Equally Effective, Differ in Cost**  
***Catheter-Directed Thrombolysis, an Interventional Radiology Procedure to Break Up Clots, is Safe and Effective, Regardless of the Drug Used***

The standard initial treatment for deep vein thrombosis (DVT) with blood thinners, such as heparin or coumadin, is important to prevent a life-threatening pulmonary embolism, but does not treat the existing clot in the leg. In catheter-directed thrombolysis, the interventional radiologist threads a catheter up the leg vein into the clot, using imaging for guidance, and breaks up the clot by infusing the clot dissolving drug directly into the clot.

The purpose of the study was to compare the efficacy, safety, and costs associated with catheter-directed thrombolysis with the drugs urokinase, alteplase and reteplase. This retrospective study included 74 patients (27 men and 47 women) with 82 involved limbs that were treated using catheter-directed thrombolysis. The study showed the three drugs are equally effective in the minimally invasive catheter-directed procedure to dissolve the blood clots with a 97.4-100 percent success rate. However, alteplase was 13 times less expensive than urokinase and four times less expensive than reteplase.

Deep vein thrombosis in a deep leg vein can be a very serious condition. The blood clots can cause permanent damage to the leg vein valves, known as post-thrombotic syndrome. The combination of vein valve damage and blocked blood flow in the vein from residual thrombus (clot) causes an abnormal pooling of blood in the leg, chronic leg pain, leg fatigue, swelling, and in extreme cases, severe skin ulcers, all symptoms of post-thrombotic syndrome. Many patients have to plan their daily activities around their leg, knowing that if they stand or exercise too long, their legs will swell or be painful.

While post-thrombotic syndrome used to be considered an unusual, long-term consequence of DVT, it actually occurs frequently, in as many as 60-70 percent of people, and can develop within two months of developing DVT. Catheter-directed thrombolysis treatment is an effective medical treatment that is widely available. It provides relief of pain and swelling and greatly reduces the likelihood of post-thrombotic syndrome. In addition, any narrowing in the vein that might lead to future clot formation can be identified by venography, an imaging study of the veins, and treated by the interventional radiologist with balloon angioplasty or stent placement to prevent another DVT. Drs. Hofmann and Grunwald, authors of the study from Johns Hopkins, hope that this study increases the awareness in the medical community of the importance of aggressive treatment of DVT, which is available from interventional radiologists.

For an abstract of the study, *Comparison of Urokinase, Alteplase, and Reteplase for Catheter-directed Thrombolysis of Deep Vein Thrombosis*, visit [www.JVIR.org](http://www.JVIR.org). *Interviews, medical illustration and broadcast quality b-roll and bites are available for DVT story.*

**New Study Shows Novel Minimally Invasive Interventional Radiology Treatment for Liver Cancer is Safe Even in Patients with Compromised Liver Blood Flow**  
*Treatment Delivers Radioactive Isotope Directly into the Liver with Embolization*

Treatment options for patients with hepatocellular carcinoma, a type of liver cancer, are limited and up to 90 percent of patients are not candidates for surgery. Although surgery offers the best chance for a cure, liver tumors are often inoperable because the tumor may be too large, or has grown into major blood vessels or other vital structures. Sometimes many small tumors are spread throughout the liver, making surgery too risky or impractical. Historically, chemotherapy drugs and external radiation therapy have been ineffective at curing inoperable liver cancer.

Embolization is a standard, well-established non-surgical interventional radiology technique that blocks the blood supply feeding a tumor, causing it to shrink. Using imaging for guidance, the interventional radiologist makes a tiny nick in the skin and inserts a tiny catheter in the femoral artery in the groin. The physician guides the catheter through the artery and then releases tiny embolic particles the size of grains of sand, called microspheres, into the blood vessels feeding the liver tumor. The spheres mechanically block the flow of blood to the tumor.

The relatively new treatment in this study combines the radioactive isotope, Yttrium-90, into the microspheres to deliver radiation directly to the tumor. As the Yttrium loaded microspheres flow preferentially to the tumors without causing significant embolization, the Yttrium-90 radioisotope is delivered directly to the tumors. This allows for a higher, local dose of radiation to be used, without subjecting healthy tissue in the body to the radiation. The Yttrium-90 radiates from within and, since it is administered in the hepatic artery, it can be viewed as “internal” radiation. It’s a unique way to attack tumors utilizing interventional radiology’s skill in embolization and delivering intravascular treatments directly to the diseased area.

“This interventional radiology treatment is a particularly elegant way to give patients a cancer treatment that doesn’t harm the healthy cells. So they don’t feel sick or have many of the side effects that happen with standard cancer treatments,” says Riad Salem, MD, MBA, author of the manuscript and interventional radiologist at Northwestern Memorial Hospital. The treatment is an out patient procedure; the main side-effect is fatigue for 7-10 days. It has been available only in select centers in the United States for patients with inoperable hepatocellular carcinoma who have an adequate level of liver function.

The purpose of this new study was to present liver toxicity results in those patients with inoperable tumors that have known impaired liver flow from an obstructed portal vein in the liver. This is relevant because many patients with liver cancer have this problem and also have been considered too high risk for embolization therapy. The study reports on

toxicity results at a single institution and after unilobar and bilobar embolization of the liver with Yttrium-90 microspheres, known as TheraSpheres. The study reports on 15 patients who received a total of 29 infusions of TheraSpheres, and in patients who did not have disease progression, there appeared to be no significant change in bilirubin, a marker for liver function.

“I am encouraged because many patients that are failing other treatments are having good disease control with Yttrium-90 microsphere treatment. While most aren’t cured, we are extending their lives and improving their quality of life. Hopefully we will be able to offer this to more patients with inoperable primary hepatocellular carcinoma with obstructed blood flow, who have been labeled ‘high risk’ for other treatment options,” says Salem. These are early promising results. Updated data will be available at the Society of Interventional Radiology’s Annual Scientific Meeting in 2005.

For an abstract of the study, *Use of Yttrium-90 Glass Microspheres (TheraSphere) for the Treatment of Unresectable Hepatocellular Carcinoma in Patients with Portal Vein Thrombosis*, visit [www.JVIR.org](http://www.JVIR.org)

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