Analysis finds mixed results for use of thrombolytic therapy for blood clot in lungs

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In an analysis that included data from 16 trials performed over the last 45 years, among patients with pulmonary embolism, receipt of therapy to dissolve the blood clot (thrombolysis) was associated with lower rates of death, but increased risks of major bleeding and intracranial hemorrhage, according to a study in the June 18 issue of *JAMA*. The authors note that these findings may not apply to patients with low-risk pulmonary embolism.

Pulmonary embolism (PE; a blockage of the main artery of the lung or one of its branches) is an important cause of illness and death, with more than 100,000 U.S. cases annually and as many as 25 percent of patients experiencing sudden death. Pulmonary embolism is also associated with an increased risk of death for up to 3 months after the initial event. Thrombolytic therapy may be beneficial in the treatment of some patients with PE, but to date, no analysis has had adequate statistical power to determine whether this therapy is associated with improved survival, compared with conventional anticoagulation, according to background information in the article.

Saurav Chatterjee, M.D., of St. Luke's-Roosevelt Hospital Center of the Mount Sinai Health System, New York, and colleagues performed a meta-analysis of 16 randomized clinical trials (n = 2,115 patients) of thrombolytic therapy for PE. Two hundred ten patients (9.9 percent) had low-risk PE, 71 percent had intermediate-risk PE, 1.5 percent had high-risk PE; risk could not be classified in 18 percent.

The researchers found that thrombolytic therapy for PE was associated with a 47 percent lower odds of death; there was 2.2 percent mortality in the thrombolytic therapy group and 3.9 percent mortality in the anticoagulant group at an average duration of follow-up of 82 days. Thrombolytic therapy was associated with a 2.7 times greater risk of major bleeding compared with anticoagulant therapy; there was a 9.2 percent rate of major bleeding in the thrombolytic therapy group and a 3.4 percent rate in the anticoagulation group. Major bleeding was not significantly increased in patients 65 years and younger.

Thrombolysis was associated with a greater intracranial hemorrhage rate (1.5 percent vs 0.2 percent) but also lower risk of recurrent PE (1.2 percent vs 3.0 percent).

In intermediate-risk pulmonary embolism trials, thrombolysis was associated with lower mortality and more major bleeding events.

"Risk stratification models for bleeding in all patients, but especially the elderly, are warranted to identify the individuals at the highest risk of hemorrhagic complications with thrombolytic therapy. Future research should also be directed toward concomitant [accompanying] use of other medications, especially the 'novel oral anticoagulants' in conjunction with thrombolytics in patients with hemodynamically stable PE," the authors write.

"The meta-analysis by Chatterjee et al raises new questions," writes Joshua A. Beckman, M.D., of Brigham and Women's Hospital, Boston, in an accompanying editorial.

"For example, should thrombolytic therapy in intermediate-risk patients older than 65 years be avoided? While the risk of bleeding is increased in older patients, the point estimate for mortality is similar to that in younger patients. Risk stratification for bleeding may favor use of

thrombolysis in patients older than 65 years. Second, would the net clinical benefit be better with consistent use of catheter-based thrombolysis using lower doses of fibrinolytic agents for significant pulmonary artery thrombus [blood clot] reduction? Additional clinical trials are needed to guide optimal use of thrombolytic therapy in patients with PE."

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