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The full report is titled "Low-Molecular-Weight Heparin Compared with Intravenous Unfractionated Heparin for Treatment of Pulmonary Embolism. A Meta-Analysis of Randomized, Controlled Trials." It is in the 3 February 2004 issue of *Annals of Internal Medicine* (volume 140, pages 175-183). The authors are D.J. Quinlan, A. McQuillan, and J.W. Eikelboom.

## Treatment of Pulmonary Embolism

### What is the problem and what is known about it so far?

A blood clot inside the deep veins of the legs is called *deep venous thrombosis*. If a piece of the clot breaks off and travels to the lungs, the clot in the lungs is called a *pulmonary embolus*. Clots in the deep veins of the legs and lungs can lead to tissue damage or even fatal complications.

Doctors use blood thinners to help dissolve clots and prevent repeated clots. For many years, they most often used a blood-thinning drug known as *unfractionated heparin* (UFH). Patients get UFH through a needle in a vein for a few days while they are in the hospital. The dose of UFH is monitored closely each day to check the amount of blood thinning that occurs. More recently, doctors have been using another preparation of heparin, low-molecular-weight heparin (LMWH). It is injected under the skin, can be given at home, and does not require close monitoring of the dose. Several studies show that LMWH is a safe and effective drug for treating blood clots in the legs. However, we know less about the relative benefits of LMWH versus UFH in the treatment of patients with clots in their lungs.

### Why did the authors do this particular study?

To summarize information about the benefits and harms of LMWH versus UFH in patients with a pulmonary embolus.

### Who was studied?

1951 patients with a pulmonary embolus who had participated in 12 different studies.

### How was the study done?

Rather than doing a new study, the researchers analyzed information from 12 randomized trials that had compared LMWH with UFH. They searched the medical literature up to August 2003 to find these trials. All of the patients in the trials had a clot in their lungs. They received either a fixed dose of LMWH injected under the skin or UFH injected into the veins. Doctors used results of blood tests that measured the clotting ability of blood to adjust doses of UFH. Patients usually were followed for at least 3 months. The researchers combined data from the trials to see how often the treatments prevented repeated clots or led to bleeding complications.

### What did the researchers find?

At 3 months, the rate of repeated blood clots was about 3% among patients given LMWH and about 4% among patients given UFH. Rates of major bleeding complications with LMWH and UFH were about 1% and 2%, respectively.

### What were the limitations of the study?

Because the number of events in the trials was small, it was difficult to precisely determine whether the 2 treatments have very similar or slightly different effects.

### What are the implications of the study?

Low-molecular-weight heparin is probably a safe and efficacious alternative to UFH for some patients with a pulmonary embolus.