Does breaking up blood clots in leg veins faster with clot-busters or mechanical devices reduce the chance of long-term complications?

In people with deep vein thrombosis (DVT), anticoagulants are used to prevent formation of new blood clots while the person's body works on breaking down the clots slowly over time. Drugs that break up blood clots (thrombolytics) and mechanical devices that chew up blood clots may work faster, but they are not better than anticoagulants at preventing complications such as post-thrombotic syndrome (PTS).

What's the evidence?

Understanding the problem

People often ask why anticoagulants are used to treat DVT instead of thrombolytics or physical removal of the clot. There are 3 important reasons for this: (1) thrombolytics are more likely to cause serious bleeding, including intracranial hemorrhage, than anticoagulants; (2) insertion of a mechanical device into veins requires both special equipment and skills; and (3) neither of these methods have been shown to be better than anticoagulants at reducing the complications of DVT. Also, people who are given thrombolytics or receive mechanical intervention still require anticoagulants following treatment to prevent new blood clots from forming.

Post-thrombotic syndrome (PTS) is a long-term complication of DVT that occurs in 25-50% of patients who have a proximal DVT. PTS includes symptoms such as leg pain, itching or heaviness, along with signs such as swelling, skin discolouration, and formation of ulcers. Most people who develop PTS do so within 2 years of being diagnosed with DVT.

Researchers recently wondered if using pharmacomechanical catheter-directed thrombolysis (PCDT; thrombolytics delivered by a tube inserted into the leg vein that also contains a mechanical device that physically chews up the clot) would be better at reducing PTS than

anticoagulants alone.

The study

Who? The study included 692 adults (average age 53 years, 62% male) who had a proximal DVT with symptoms (pain, swelling) that started *within the past 14 days*.

What? The study compared PCDT plus anticoagulant therapy with anticoagulant therapy alone.

PCDT plus anticoagulant therapy	vs	Anticoagulant therapy alone
Alteplase (clot-buster drug) delivered by a tube inserted into the vein that also contains a mechanical device to physically break up the clot Anticoagulant therapy plus knee-high compression stockings (30-40 mm Hg pressure)		Anticoagulant therapy plus knee-high compression stockings (30-40 mm Hg pressure)

What the researchers found

People who received PCDT plus anticoagulant **therapy were not less likely to develop** PTS **than people who received** anticoagulant **therapy alone.**

*It is important to note that there are special circumstances where a physician may still recommend PCDT.

Summary of findings

PCDT plus anticoagulant **therapy vs** anticoagulant **therapy alone in people who have a new proximal leg** DVT

Outcomes	Rate of events with PCDT + anticoagulant therapy	Rate of events with anticoagulant therapy alone	Results

Outcomes	Rate of events with PCDT + anticoagulant therapy	Rate of events with anticoagulant therapy alone	Results
Post-thrombotic syndrome at 24 months	47 people out of 100	48 people out of 100	No difference*
Major bleeding within 10 days of treatment	2 people out of 100	1 person out of 100	About 1 more person out of 100 had a major bleed after PCDT + anticoagulant therapy compared with anticoagulant therapy alone

*Although the rates for the 2 groups look different, the differences were not statistically significant—this means that the difference could simply be due to chance rather than due to the different treatments.

This Evidence Summary is based on the following article:

Vedantham S, Goldhaber SZ, Julian JA, et al. ***Pharmacomechanical Catheter-Directed Thrombolysis for Deep-Vein Thrombosis.*** *N Engl J Med. 2017 Dec 7;377(23):2240-2252. doi: 10.1056/NEJMoa1615066. PubMed (https://www.ncbi.nlm.nih.gov/pubmed/29211671?dopt=Abstract)*

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Glossary

anticoagulant	medications that prevent blood clots from forming or travelling (aka blood thinner)
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DVT	formation of a blood clot within a vein deep within the leg

intracranial hemorrhage	bleeding inside the skull
major bleeding	serious bleeding (e.g. requiring a visit to the doctor or hospital, an invasive test to find the source of bleeding or a blood transfusion)
proximal DVT	a blood clot within the leg vein(s) at or above the knee (e.g. popliteal, superficial femoral, common femoral, iliac, inferior vena cava) or within the arm vein(s) above the elbow (e.g. jugular, subclavian, axillary, brachial)
PTS	a complication resulting from a DVT, resulting in discomfort, swelling, discolouration or ulcers that persist beyond 3 months
thrombolytics	drug that breaks up blood clots
ulcers	open sore