Several studies have consistently demonstrated the capability of ultrasound to enhance the lysis of intra-arterial thrombi in acute ischemic stroke during systemic intravenous thrombolysis with tissue plasimogen activator (tPA), an intervention also called sonothrombolysis.

**Material and Methods**

**Objectives**
1. To quantify the potential benefits of sonothrombolysis in acute ischemic stroke.
2. To quantify the potential harms of sonothrombolysis.

**Types of Studies**
Randomized controlled trials with clear allocation concealment.

**Types of Participants**
Patients admitted to hospital with acute ischemic stroke.

**Types of Interventions**
Sonothrombolysis versus intravenous tPA therapy alone or conventional treatment.

**Primary Outcomes**
Survival free of significant disability at the end of follow-up.

**Secondary Outcomes**
Case fatality, vessel recanalization, symptomatic and asymptomatic hemorrhagic transformation, and cerebral hemorrhage.

**Results**
We included 5 studies, with a total of 233 patients randomized. However, not all patients were available for all outcomes: for instance, follow-up at 3 months (death and dependency) was available for 206 patients (88.4%). Three studies used transcranial color-coded duplex, and 2 used transcranial color doppler. The duration of sonothrombolysis varied from 1 to 2 hours. When we considered all the 5 studies, we observed a statistically significant difference for the primary outcome (death or disability at 3 months; 206 patients; odds ratio, 0.50; 95% confidence interval [CI], 0.27–0.91). Results for death were neutral (206 patients; odds ratio, 1.00; 95% CI, 0.46–2.16); failure to recanalize was lower in the sonothrombolysis group (230 patients; odds ratio, 0.28; 95% CI, 0.16–0.50); and there was a nonsignificant trend for increasing cerebral hemorrhages (233 patients; odds ratio, 2.35; 95% CI, 0.95–5.80). When including patients only treated with tPA, the results were very similar.

**Conclusions**
Our results indicate that sonothrombolysis performed in patients with recent onset ischemic stroke with evidence of middle cerebral artery or posterior cerebral artery occlusion produces a significant increase in the recanalization rate (Figure), associated with a nonsignificant increase of hemorrhagic transformation of the cerebral infarction. There was a statistically significant clinical improvement at the 3-month follow-up in terms of death plus disability rate, although with very wide CIs.

**Implications for Practice**
There is insufficient evidence to establish the effectiveness and safety of sonothrombolysis in routine clinical practice.

**Implications for Research**
Sonothrombolysis is a promising technique but there is a clear need for a new multicenter randomized trial.

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**Disclosures**
None.

**Reference**

**Keywords**
- hemorrhage
- recanalization
- sonothrombolysis
**Figure.** Failure to recanalize. CI indicates confidence interval.
Sonothrombolysis for Acute Ischemic Stroke
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