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Serious hemorrhage and secondary prevention after stroke and TIA

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Akademisk avhandling

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Abstract
Aims To assess the incidence of intracranial haemorrhage (ICrH) and any serious hemorrhage after ischemic stroke (IS) or transient ischemic attack (TIA) and if a nurse-led, telephone-based intervention including medical titration could improve blood pressure (BP) and low-density lipoprotein cholesterol (LDL-C) levels after stroke/TIA.

Methods Data from all patients registered with an IS in the national stroke register Riksstroke 1998–2009 were combined with data from the National Patient Register, and a diagnosis of intracranial haemorrhage (ICrH) within 1 year after IS was identified. Any diagnosis of serious hemorrhage during follow-up until 2016 was identified in all patients with an IS/TIA diagnosis during 2010–2013 at Östersund hospital. Incidences were calculated, temporal trends of ICrH assessed, and factors associated with an increased risk of hemorrhage identified in both populations. In the randomized controlled NAILED (Nurse-based Age-independent Intervention to Limit Evolution of Disease) trial, all patients with acute stroke or TIA treated at Östersund hospital 2010–2013 were screened for participation. Eligible patients were randomized to a control group with follow-up according to usual care or to an intervention group with a nurse-led, telephone-based follow-up including titration of medication. BP and LDL-C were assessed at 1, 12, 24, and 36 months, and the effect of the intervention on mean levels of BP and LDL-C and on proportions of patients reaching treatment target was analysed at 12 and 36 months.

Results The incidences of an ICrH and any serious hemorrhage, after the acute phase of an IS or TIA were 0.85%–0.96% and 2.48% per year at risk, respectively. Between 1998 and 2009, the risk of an ICrH increased during the first 30 days after an IS but decreased during days 31–365. A serious hemorrhage increased the risk of death in patients with good functional status but did not affect the already high mortality in patients with impaired functional status. Patients with impaired functional status and who were elderly had higher incidence rates of hemorrhage. Male sex and previous ICrH were associated with an increased risk of ICrH during the first year after IS, and thrombolytic treatment was associated with an increased risk in the acute phase. A previous diagnosis of hypertension was associated with an increased risk of all serious hemorrhages. The NAILED trial intervention group had a significantly lower mean systolic BP (SBP), diastolic BP (DBP), and LDL-C at 12 and 36 months. The mean SBP at 36 months was 128.1 mmHg (95% confidence interval (CI): 125.8–130.5) in the intervention group, 6.1 mmHg (95% CI: 3.6-8.6; $p<0.001$) lower than in the control group. An interaction analysis at 12 months showed that the effect of the intervention was confined to patients whose values were above the respective targets at baseline and therefore had their medication adjusted. At 36 months, a significantly higher proportion of patients in the intervention group reached treatment targets for SBP, DBP, and LDL-C. The mean differences and differences in proportions reaching treatment target for BP increased during the 36 months of follow-up.

Conclusion A serious hemorrhage after an IS or TIA is fairly common and could affect survival in patients with good functional status. The nurse-led, telephone-based intervention including medical titration used in the NAILED stroke trial improved risk factor levels after stroke and TIA, and more patients reached treatment targets. The effect increased over time.

Keywords
Stroke, transient ischemic attack, intracerebral hemorrhage, intracranial haemorrhage, serious haemorrhage, secondary prevention, modifiable risk factors, randomized controlled trial

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