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Abstracts

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American Association of Neurological Surgeons/Congress of Neurological Surgeons Cerebrovascular Section

American Society of Interventional and Therapeutic Neuroradiology

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Tissue-type Plasminogen Activator Polymorphisms and Stroke Risk in a Biracial Population: The Stroke Prevention in Young Women Study

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Background and Purpose: Tissue-type plasminogen activator (tPA) has important physiologic roles both in endogenous fibrinolysis within the vascular compartment and as a regulator of permeability of the neurovascular unit. We sought to evaluate the association of polymorphisms within the *PLAT* gene, which encodes the tPA protein, with stroke risk among young African-Americans (AA) and Caucasians (CAU). **Methods:** A population-based case-control study of stroke among women aged 15–49 identified 300 cases of first ischemic stroke (51% AA) and 225 age-comparable control subjects (44% AA). Prior vascular disease-associated single nucleotide polymorphisms (SNPs) were supplemented with HapMap SNPs to comprehensively cover the *PLAT* gene. These SNPs were assessed for association with stroke. **Results:** Preliminary analysis of the first seven SNPs revealed four SNPs associated with stroke under a dominant model among African-Americans but not Caucasians.

			Age-Adjusted			Vascular Model *		
SNP, Allele	Allele frequency	Race	OR	95% CI	p-value	OR	95% CI	p-value
RS2020918, C	0.76	AA	4.6	1.1–18.2	0.03	5.4	1.2–24.7	0.03
	0.69	CAU	0.9	0.4–2.3	0.82	1.2	0.4–3.6	0.76
RS7007329, C	0.08	AA	2.5	1.0–5.9	0.04	3.3	1.3–8.8	0.02
	0.27	CAU	1.0	0.6–1.9	0.92	1.0	0.5–1.9	0.92
RS2020922, T	0.08	AA	2.2	0.9–5.4	0.09	3.0	1.1–8.4	0.03
	0.28	CAU	1.0	0.6–1.8	0.93	1.016	0.5–1.9	0.96
RS1050275, C	0.09	AA	2.3	1.0–5.4	0.06	3.1	1.2–8.2	0.02
	0.26	CAU	1.1	0.6–1.2	0.8	1.1	0.6–2.0	0.86

* Adjusted for age, smoking, oral contraceptive use, hypertension, diabetes, and angina or myocardial infarction. **Conclusions:** This study provides the first evidence that *PLAT* polymorphisms are associated with early-onset ischemic stroke among African-American women. Further analyses are in progress to confirm these findings and clarify their implications.

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Gamma-glutamyltransferase Predicts Mortality from Both Ischemic and Hemorraghic Stroke in a Cohort of 170,244 Men and Women

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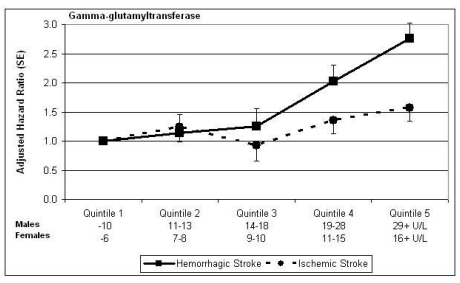
Introduction: Recent evidence suggests that gamma-glutamyltransferase (GGT) level is a predictor of cerebrovascular disease and plays a role in atherogenesis. Few studies are sufficiently powered to discriminate this relationship separately for ischemic and hemorrhagic stroke. Hypothesis: We assessed whether GGT is an independent risk factor for stroke mortality in 170,244 participants of the Vorarlberg Health Monitoring & Promotion Program followed for up to 18 years (1985–2002). Methods: There were 959 fatal events, 192 from hemorrhagic, 243 from ischemic and 524 from undefined stroke (62% of undefined strokes were diagnosed in participants dying aged 80 or over). Sex-stratified Cox proportional-hazards models, adjusted for age and established risk factors including total cholesterol, blood pressure and smoking, were performed to calculate hazard ratios (HR) and 95% confidence intervals per quintiles of GGT. Results: Compared to the lowest GGT quintile, adjusted HR for participants in the highest quintile were 1.92 (1.53–2.42) for all strokes, 2.76 (1.65–4.63) for hemorrhagic and 1.57 (1.01–2.45) for ischemic strokes. There was significant effect modification by age ($p<0.001$). Subgroup analyses revealed stronger relationships of GGT to outcome in younger participants. Adjusted HR for all strokes was 4.63 (2.25–9.53) in participants under 60 years. Conclusions: These results provide clear evidence of a positive association between high GGT and mortality from stroke, markedly stronger in younger people and for hemorrhagic events. The findings further highlight the clinical importance of GGT in the pathophysiology of cerebrovascular disease.



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Failures in Guideline-Based Care of Diabetics Admitted with Ischemic Stroke or TIA in GWTG-Stroke

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Background: Diabetes Mellitus (DM) is a strong risk factor for stroke, and recent guidelines recommend rigorous glycemic control to prevent complications. We analyzed failure to detect or manage DM prior to admission, and the diabetic-specific hospital-based acute stroke care after ischemic stroke (IS)/TIA in the Get With The Guidelines-Stroke database. **Methods**: We analyzed 159,338 IS/TIA patients at 659 hospitals to identify 49,066 (30.8%) patients with either known DM (Known DM) or who were newly diagnosed with DM during admission (New Dx DM). There were 46,436 Known DM (defined as history of DM or taking hypoglycemic agents before admission) and in addition 2,630 New Dx DM (defined as admission HbA1C>7% or discharged on new diabetic medications, and no prior history of DM). Overweight was defined as BMI $\geq$25 and obese as $\geq$ 30 kg/m^2. Known DM were compared to New Dx DM by Wilcoxon two-sample test for continuous variables and chi-square test for categorical variables. Performance and Quality Measures relevant to diabetics from the pre-defined GWTG measure set are listed in Table 2. **Results**: New DX DM were different from Known DM in their risk factor profile with more IS, higher LDL and HbA1C, less obesity and fewer recognized vascular risk factors prior to admission in the New Dx DM group. In addition, Known DM did not have HbA1C or LDL measurement while in hospital and 31% were obese. Of those with LDL measured, 29% were above the LDL goal of 100 mg/dL. Differences in GWTG Performance and Quality Measures relevant to diabetes are listed below. **Conclusion**: Despite high rates of DM in the community, evidence-based targets for risk factor control are infrequently achieved in these patients at the time of admission for ischemic cerebrovascular disease. In addition, the detection criteria for DM in our study likely underestimate the true population of DM, especially given low rates of HbA1C measurement. Though a small fraction of admitted patients, newly diagnosed diabetics have more poorly controlled risk factors at admission and at discharge. This may place them at higher risk for recurrent stroke and cardiovascular complications. Greater efforts at early detection of DM and improved risk factor control among known DM are warranted.

Factors Significant on Univariate Analysis	Known DM		New DX DM		p value
Demographics	(n)	(%)	(n)	(%)	
Age (mean)	46436	70.05	2630	68.67	<.0001
BMI (mean, kg/m2)	35546	29.59	1963	28.84	<.0001
Obese	14491	31.21	716	27.22	<.0001
Current Atrial Fib	4734	10.20	341	12.99	<.0001
Previous Stroke/TIA	16724	36.02	603	22.97	<.0001
Carotid Stenosis	2651	5.71	111	4.23	0.0014
PVD	3481	7.50	97	3.70	<.0001
Hypertension	38308	82.50	1720	65.52	<.0001
Dyslipidemia	19252	41.46	699	26.63	<.0001
Smoker	6364	13.71	521	19.85	<.0001
Stroke type (% IS)	36079	77.70	2333	88.71	<.0001
Total Cholesterol (mean)	28824	178.24	1994	192.46	<.0001
LDL (mean)	27100	106.06	1858	117.64	<.0001
LDL (% missing)	19336	41.64	772	29.35	<.0001
HbA1C (mean)	15551	7.87	1426	8.18	<.0001
HbA1C (% missing)	30885	66.51	1204	45.78	<.0001

Univariate Analysis	Known DM		New DX DM		
Performance Measures	(n)	(%)	(n)	(%)	p value
Antithrombotics <48hr	36124	93.73	2085	92.71	0.05
DC Antithrombotics	38090	96.95	2219	97.24	0.42
DC Cholesterol reducing Tx	21197	81.54	1084	77.76	0.0004
Quality Measures	(n)	(%)	(n)	(%)	
Diabetic medication at DC	32217	79.61	1924	87.89	N/A*
Weight Management for BMI>25 kg/m^2	7237	37.66	445	42.79	0.0009
ACE/ARB selected if DC on antiHTN agent	21204	60.57	1108	57.86	0.02
HbA1C > 7% in DM	8707	18.75	959	36.46	<.0001
LDL > 100 mg/dL	13310	28.66	1167	44.37	<.0001

* Comparison not valid since use of diabetic medication at discharge is part of the definition of New Dx DM.

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Prevalence of CADASIL Disease in Young Patients with Lacunar Infarcts

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Background: CADASIL disease *(Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leucoencephalopathy*) is characterized by recurrent cerebral ischemic attack, usually of the lacunar subtype, at an early age. Our aim was to analyze the prevalence of CADASIL disease in young patients with lacunar infarct without hypertension or diabetes mellitus. **Méthods**: We retrospectively analyzed patients under 65 years who presented cerebral ischemia of the lacunar subtype but no hypertension, diabetes mellitus or other causes of this disorder according to TOAST criteria. In all patients we performed immunohistochemistry analysis on 5 um frozen sections from skin biopsy with monoclonal antibody anti- Notch 3 (1E4) and the genetic analysis from the exons 3, 4, 5, 6,11 and 19 of Notch 3 gen. In the cases where immunohistochemistry analysis demonstrated accumulations of Notch 3 protein in the vascular