

Etiology, Prognosis and Intervention Related Researches of ICH in China

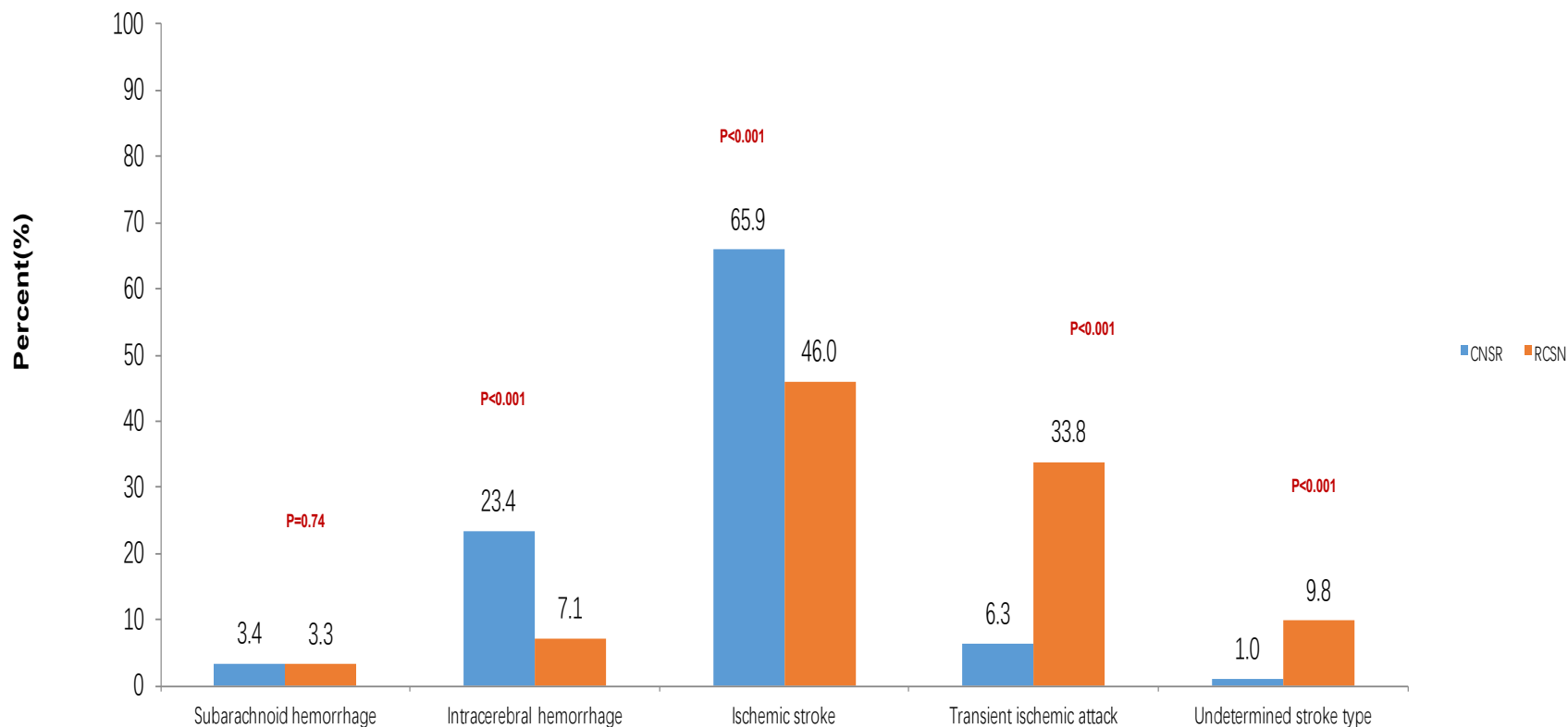


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Stroke type in CNSR and RCSN



3 times

RCSN: Registry of the Canadian Stroke Network
CNSR: China National Stroke Registry

BEIJING TIAN TAN HOSPITAL



published

Contrast extravasation
Cytotoxic edema
Molecular marker
Kailuan Study

ongoing

Multimodal CT
Beijing registry
MicroRNA
Tranexamic acid

BJTTH: Beijing Tiantan Hospital





No. 1 Contrast extravasation

Stroke

JOURNAL OF THE AMERICAN HEART ASSOCIATION



Contrast Extravasation on Computed Tomography Angiography Predicts Clinical Outcome in Primary Intracerebral Hemorrhage

A Prospective Study of 139 Cases

Na Li, MD*; Yilong Wang, MD, PhD*; Wenjuan Wang, MD; Li Ma, MD; Jing Xue, MD; Karin Weissenborn, MD; Reinhard Dengler, MD; Hans Worthmann, MD; David Z. Wang, DO; Peiyi Gao, MD, PhD; Liping Liu, MD, PhD; Yongjun Wang, MD; Xingquan Zhao, MD, PhD

Conclusions—The presence of contrast extravasation on multidetector CT angiography in patients with hyperacute-stage intracerebral hemorrhage is an independent and strong factor associated with poor outcome. Any patient with intracerebral hemorrhage with such sign on multidetector CT angiography should be monitored intensely and treated accordingly. (*Stroke*. 2011;42:3441-3446.)

No. 1 Contrast extravasation

- A prospective study from Beijing Tiantan Hospital

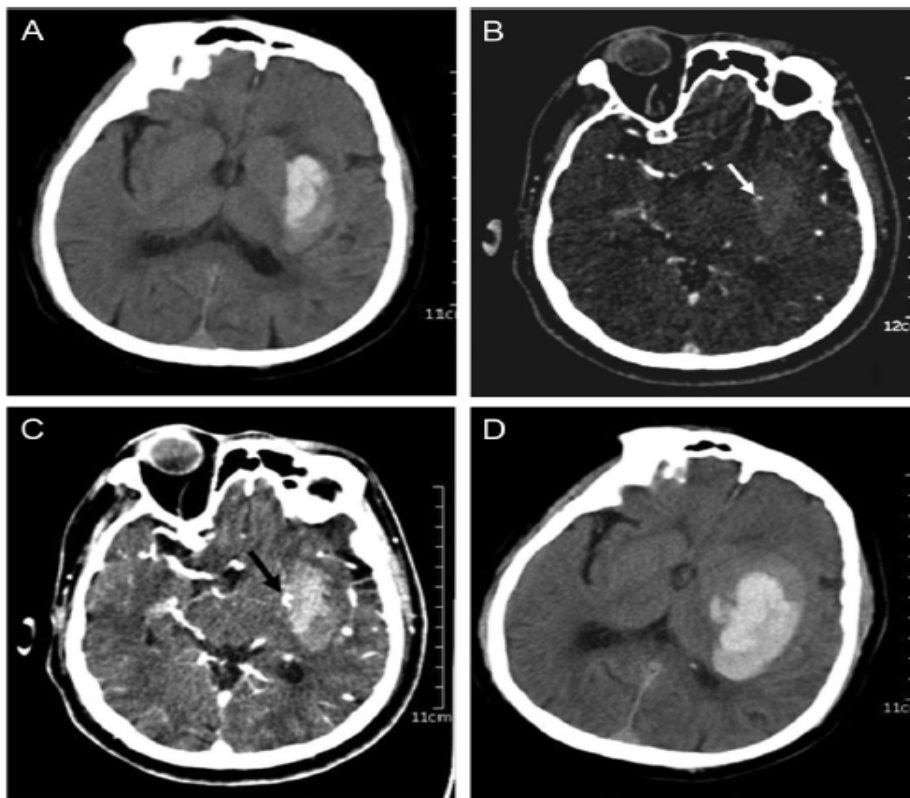


Figure. MDCTA at 2 hours after symptom onset. **A**, Baseline NCCT demonstrated hematoma in left basal ganglia. **B–C**, Contrast extravasation was shown on MDCTA source image (white arrow) and reconstructed image (black arrow). **D**, Follow-up NCCT at 24 hours showed hematoma expansion. MDCTA indicates multidetector CT angiography; NCCT, noncontrast CT.



No. 1 Contrast extravasation

Table 1. Comparison in Outcomes for Patients With ICH With and Without Contrast Extravasation

Clinical Outcomes	No Contrast Extravasation (n=109)	Contrast Extravasation (n=30)	<i>P</i>
Hematoma expansion	9 (8.3%)	23 (76.7%)	<0.0001
In-hospital mortality	4 (3.7%)	6 (20.0%)	0.008
Poor outcome on discharge	76 (69.7%)	27 (90.0%)	0.025
Overall hospitalization days	21.7±11.5	25.0±17.9	0.006
Hospitalization days of expired patients	7.3±7.2	2.2±1.5	0.022
Mortality at 3 mo	8 (7.3%)	8 (26.7%)	0.009
Poor outcome at 3 mo	46 (42.2%)	26 (86.7%)	<0.0001

Table 4. Multivariable Analysis of Predictors of 90-Day Poor Clinical Outcome

Variables	OR (95% CI)	<i>P</i>
Male gender	0.495 (0.196–1.253)	0.138
Age	1.019 (0.983–1.057)	0.296
GCS	0.876 (0.735–1.045)	0.142
Platelet count	1.005 (0.998–1.012)	0.166
Time from symptom onset to MDCTA	0.862 (0.659–1.129)	0.282
Hematoma expansion	1.244 (0.328–4.723)	0.748
Intraventricular hemorrhage volume	0.997 (0.944–1.053)	0.912
Hematoma volume	1.041 (1.009–1.075)	0.013*
Extension of Intraventricular hemorrhage	3.423 (1.514–7.740)	0.003*
Contrast extravasation	10.504 (3.180–34.694)	<0.0001*

GCS indicates Glasgow Coma Scale; MDCTA, multidetector CT angiography; OR, odds ratio; CI, confidence interval.

*Multivariable analysis was performed with a backward stepwise logistic regression model. Variables were retained in the logistic regression model for $P \leq 0.10$, a value of $P < 0.05$ was considered significant.



No. 2 Cytotoxic edema



Hannover Medical School

Stroke

JOURNAL OF THE AMERICAN HEART ASSOCIATION



Temporal Pattern of Cytotoxic Edema in the Perihematomal Region After Intracerebral Hemorrhage : A Serial Magnetic Resonance Imaging Study

Na Li, Hans Worthmann, Meike Heeren, Ramona Schuppner, Milani Deb, Anita B. Tryc, Eva Bueltmann, Heinrich Lanfermann, Frank Donnerstag, Karin Weissenborn and Peter Raab

Stroke. published online February 7, 2013;

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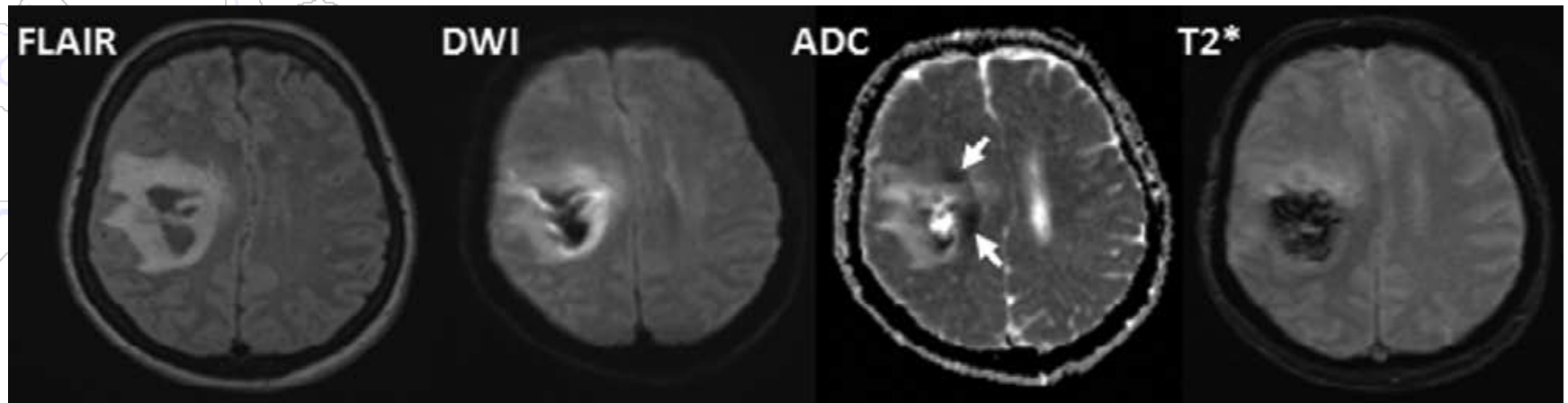
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No. 2 Cytotoxic edema (CE)



cytotoxic edema (CE) on magnetic resonance imaging.

White arrow indicates CE.

ADC indicates apparent diffusion coefficient





No. 2 Cytotoxic edema (CE)

- 9/20 (45%) occur CE

Day 1

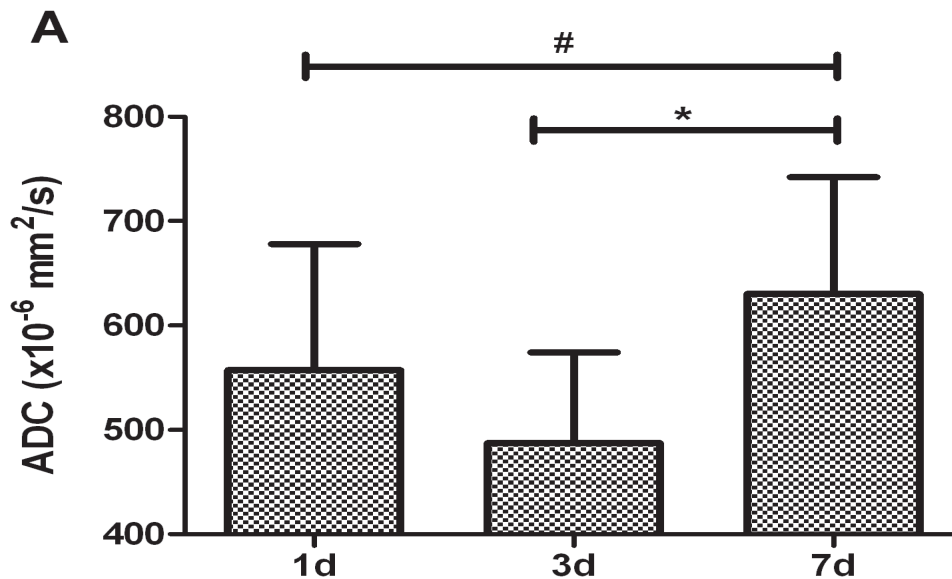
Day 3

- 8 exist
- 1 new occur
- 1 dropout

- 6 exist
- 2 disappear
- 1 dropout

Day 7

3d most obvious
7d tend to be relieve

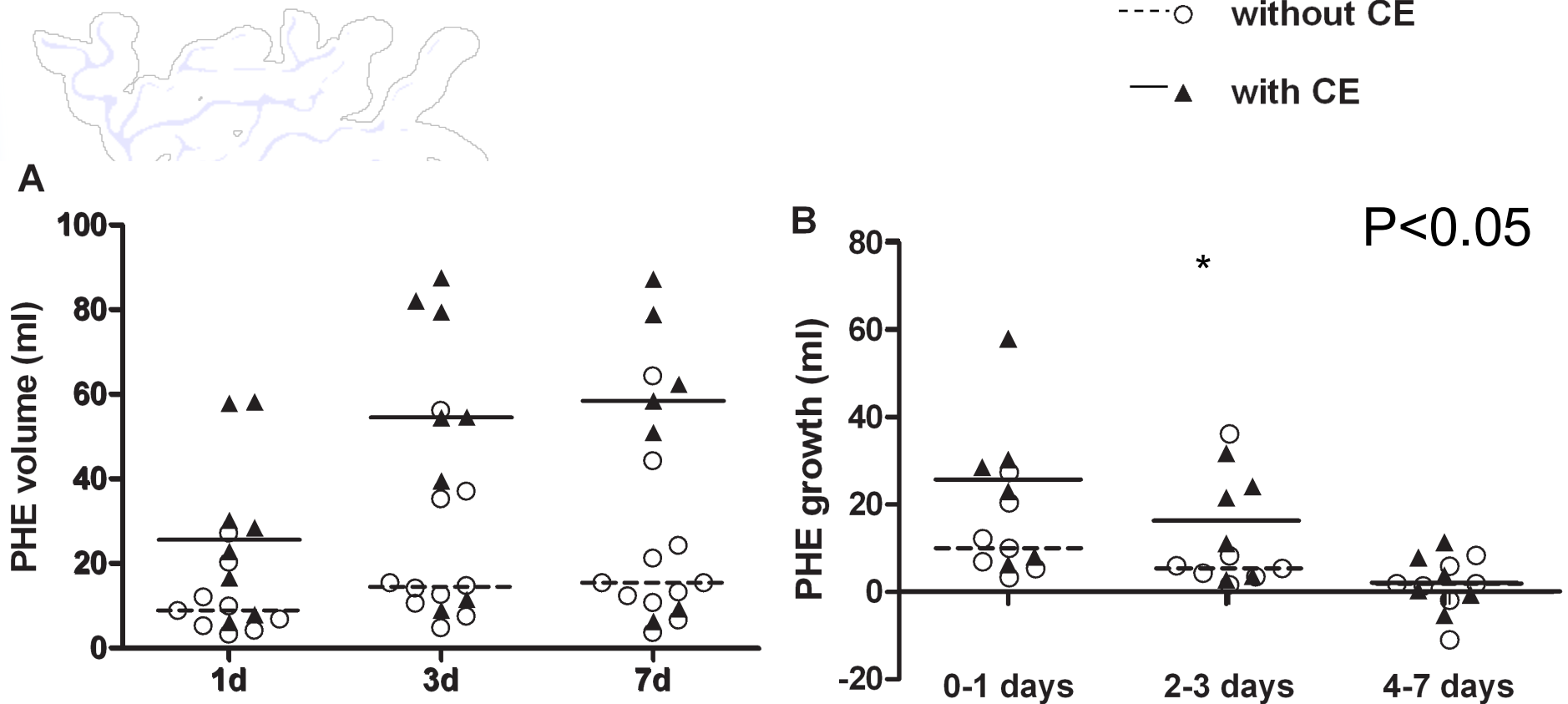


P<0.05





No. 2 Cytotoxic edema (CE)



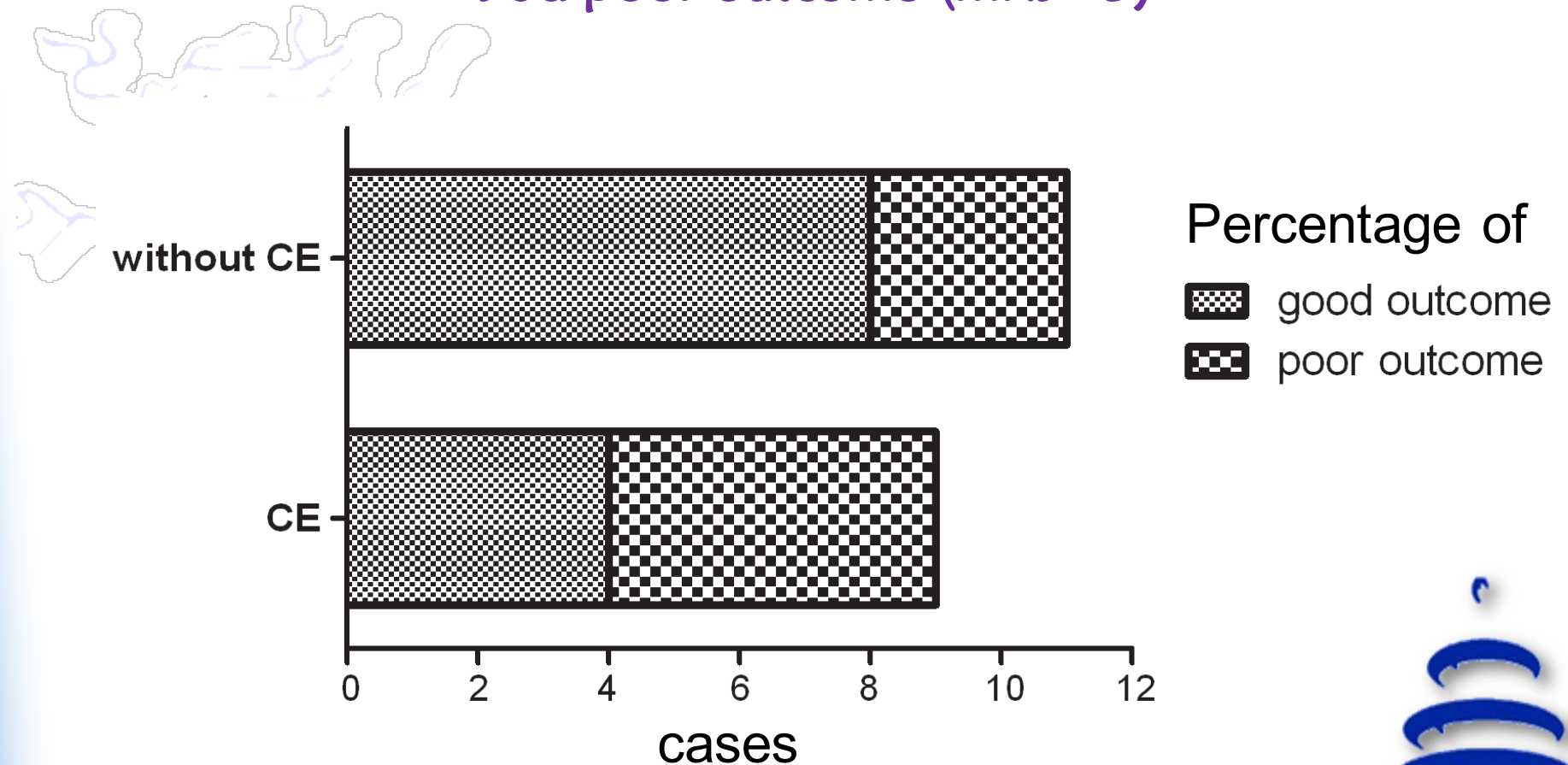
PHE: Perihematoma Edema

Li N et al, 2013, Stroke.



No. 2 Cytotoxic edema (CE)

90d poor outcome (mRS>3)





No. 2 Cytotoxic edema (CE)

1

- CE usually occurs within 24h of ICH onset. 3d presents most obvious and 7d tends to be relieve.

2

- CE is the symptom of early damage, companied with obvious PHE and faster growth.

3

- CE influenced the outcome in our study.





No. 3 Molecular marker

Stroke

JOURNAL OF THE AMERICAN HEART ASSOCIATION



Association of Molecular Markers With Perihematomal Edema and Clinical Outcome in Intracerebral Hemorrhage

Na Li, Yan Fang Liu, Li Ma, Hans Worthmann, Yi Long Wang, Yong Jun Wang, Yi Pei Gao, Peter Raab, Reinhard Dengler, Karin Weissenborn and Xing Quan Zhao

Stroke. published online February 6, 2013;

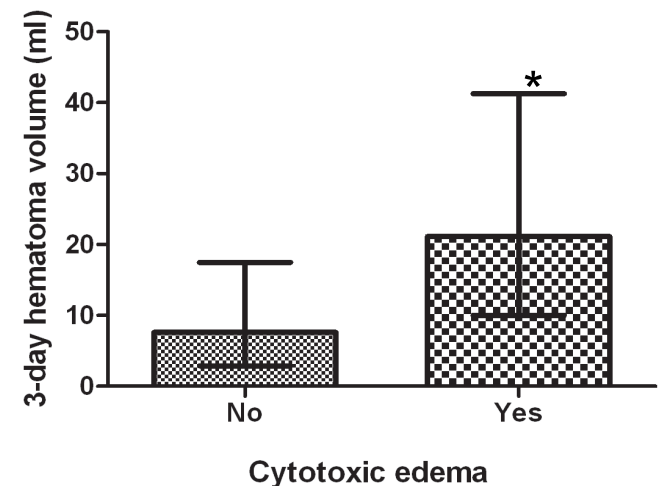
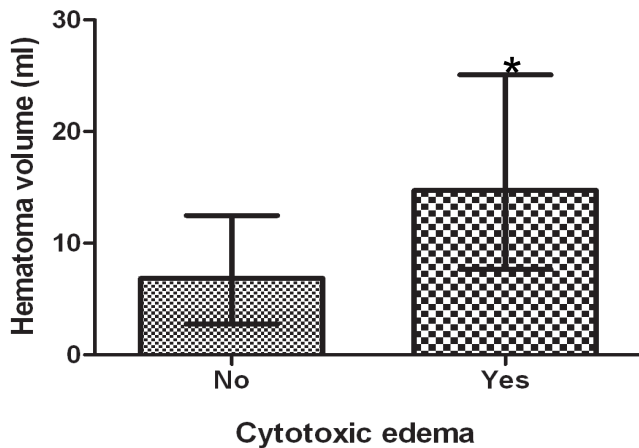
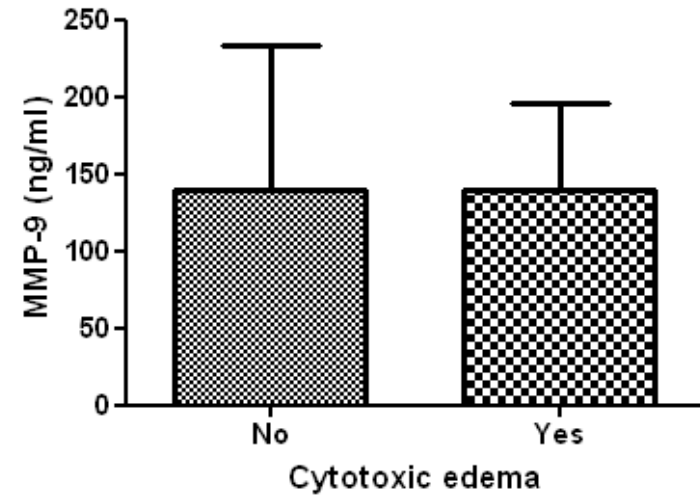
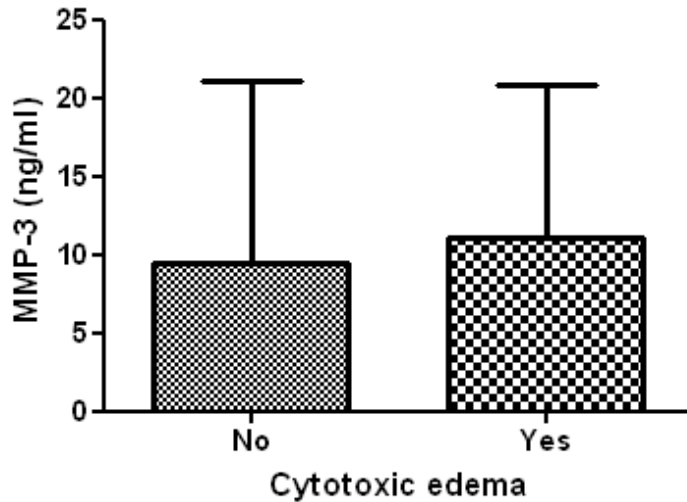
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No. 3 Molecular marker





No. 3 Molecular marker

	MMP-3			
	Model 1		Model 2	
	Beta	P value	Beta	P value
PHE volume on day 3	0.370	0.004*	0.138	0.043*

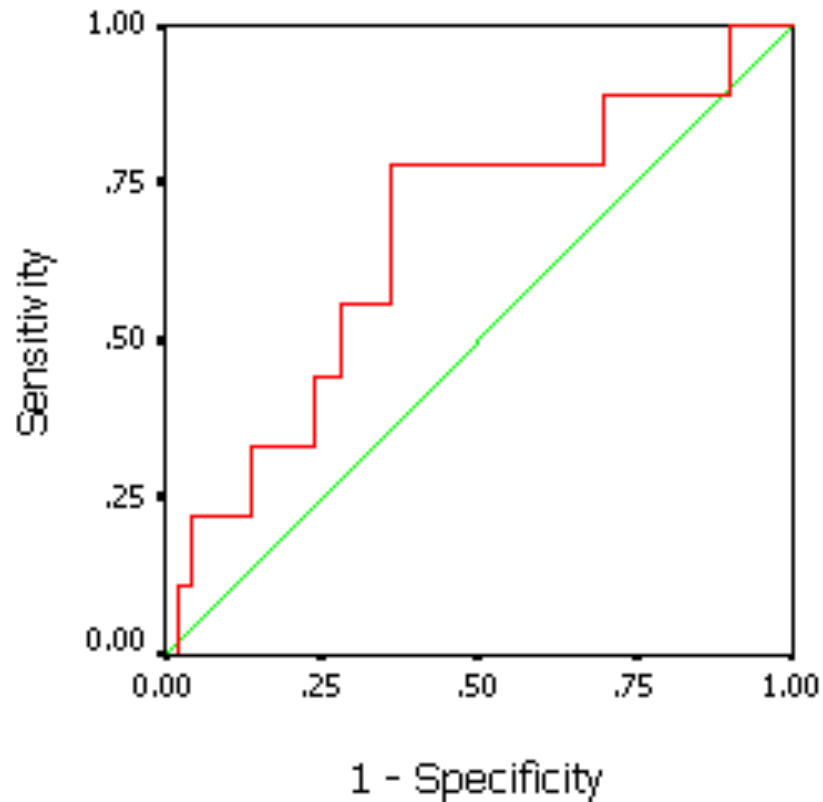
Model 1: age, sex, MMP-3, MMP-9;

Model 2: age, sex, hematoma volume, MMP-3, MMP-9



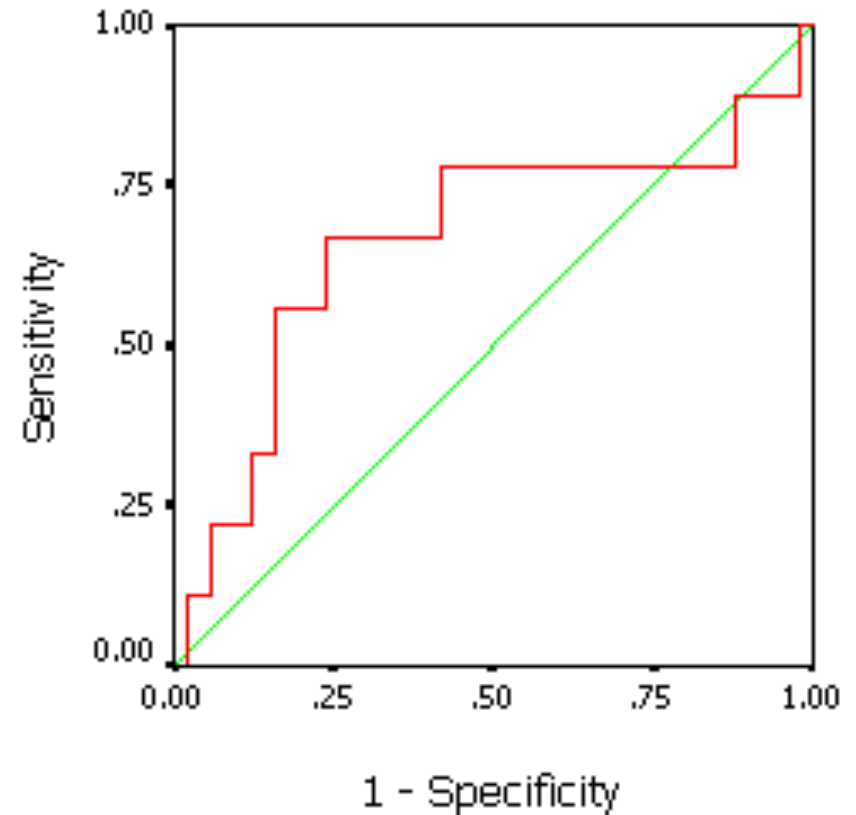


No. 3 Molecular marker



MMP-3

Cutoff point=12.4 ng/ml



MMP-9

Cutoff point= 192.4 ng/ml



No. 3 Molecular marker

	Poor 90-day outcome (mRS>3)	
	OR	P value
MMP-3 ≥ 12.4 ng/ml	25.3	0.035*
MMP-9 ≥ 192.4 ng/ml	68.9	0.023*
NIHSS	1.7	0.005*

Adjusted by age, sex, hematoma volume and GCS/ NIHSS





No. 3 Molecular marker

1

- CE may be caused by hematoma or some toxicant.

2

- MMP-3 is the independent predictive factor of PHE.

3

- MMP-3 and MMP-9 are the independent predictive factors of poor outcome.



No. 4 Kailuan Study

Stroke

JOURNAL OF THE AMERICAN HEART ASSOCIATION



Ideal Cardiovascular Health Metrics and the Risks of Ischemic and Intracerebral Hemorrhagic Stroke

Qian Zhang, Yong Zhou, Xiang Gao, Chunxue Wang, Shufeng Zhang, Anxin Wang, Na Li, Lihong Bian, Jianwei Wu, Qian Jia, Shou

OPEN ACCESS Freely available online



Relationship between C - Reactive Protein and Stroke: A Large Prospective Community Based Study

Yanfang Liu^{1,3}, Jing Wang^{1,3}, Liqun Zhang², Chunxue Wang¹, Jianwei Wu¹, Yong Zhou¹, Xiang Gao^{3,4}, Anxin Wang¹, Shouling Wu^{5*}, Xingquan Zhao^{1*}

1 Department of Neurology, Beijing Tiantan Hospital, Capital Medical University, Beijing, China, 2 Neurology Department, St George's Hospital, London, United Kingdom, 3 Channing Laboratory, Department of Medicine, Brigham and Women's Hospital, and Harvard Medical School, Boston, MA, United States of America, 4 Department of Nutrition, Harvard University School of Public Health, Boston, MA, United States of America, 5 Department of Cardiology, Kailuan Hospital, Hebei United University, Tangshan, China

ORIGINAL ARTICLE

...ia and glomerular filtration rate on risk of
...rebral hemorrhagic stroke: a result from the
Kailuan study



...ein Cholesterol on the Risks of Kailuan Study

...hunxue Wang¹, Anxin Wang¹, Qian Zhang^{1,2}, Xiang
...o^{1*}

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na, 3 Channing Laboratory, Department of Medicine, Brigham and Women's Hospital
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erelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania,
hebei United University, Tangshan, China



No. 4 Kailuan Study

1

- Ideal Cardiovascular Health Metrics is associated with both IS and ICH.(Q Zhang, et al, 2013, stroke)

2

- Non-high-density lipoprotein cholesterol is associated with IS, but not ICH. (JW Wu, et al, 2013, Plos One)

3

- Hs-CRP is associated with IS, but not ICH. (J wang, et al, 2014, Plos One)

4

- Estimated glomerular filtration rate is associated with both IS and ICH.(ZX Li, et al, 2014, Euro J Neur)



ICH in BJTTH

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Beijing registry
MicroRNA
Tranexamic acid

BJTTH: Beijing Tiantan Hospital





No. 1 Multimodal CT

- **Title:**
 - Multimodal CT Using in Acute ICH Patients Study
- **Aim:**
 - make a standard about multimodal CT application
 - evaluate ICH treatment and prognosis individually according to the multimodal CT results





No. 1 Multimodal CT

Multimodal CT

CT (NCCT)

location
volume
IVH
hematoma
growth

CTA

etiology
contrast
extravasation

CTV

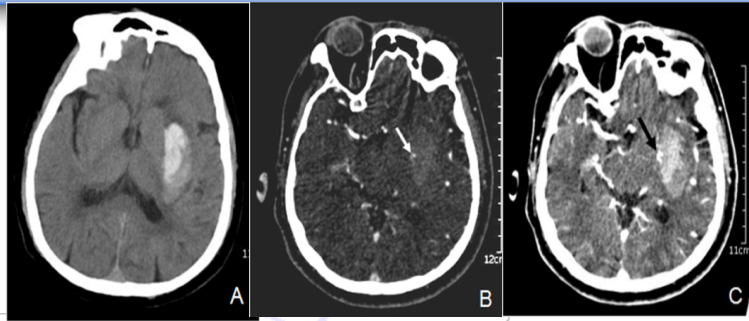
blockage
of venous
return

CTP

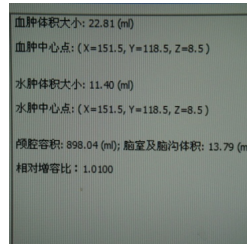
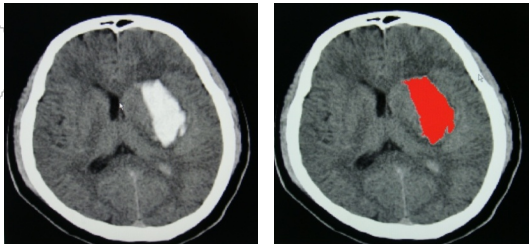
permeability
surface area
product



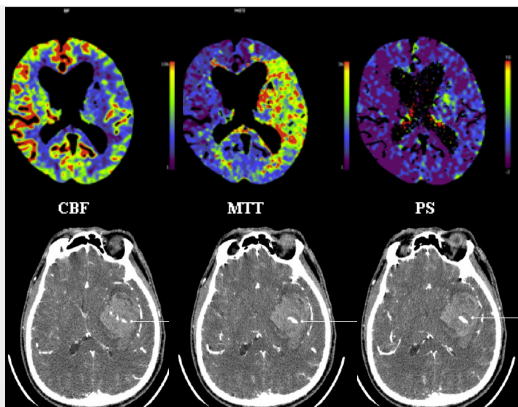
No. 1 Multimodal CT



contrast extravasation:
poor outcome



relative increased volume ratio:
brain herniation



Permeability surface area product :
blood brain barrier integrity



No. 2 Beijing Registry

- **Title:**

- Beijing ICH Registry Study

- **Aim:**

- build a ICH cohort study with demographic, clinical, imaging, hematological, treatment and prognosis information in Beijing.
- study the prognosis predictive factors and other related indexes





No. 3 MicroRNA

- **Title:**
 - Target Gene on MicroRNA to Predict the Hematoma Enlargement of ICH
- **Aim:**
 - find out the susceptibility gene of the hematoma enlargement on ICH patients
 - find out the molecular genetic targets of hematoma enlargement in Han Chinese, for the early warning and intervene of ICH



No. 4 Tranexamic acid

- **Title:**
 - Acute ICH Hemostatic Therapy Based on Spot Sign/
Contrast Extravasation
- **Aim:**
 - find out whether tranexamic acid could prevent
hematoma enlarge and improve the outcome in spot sign
positive ICH patients





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Thank you
for your attention.

2016.4.26