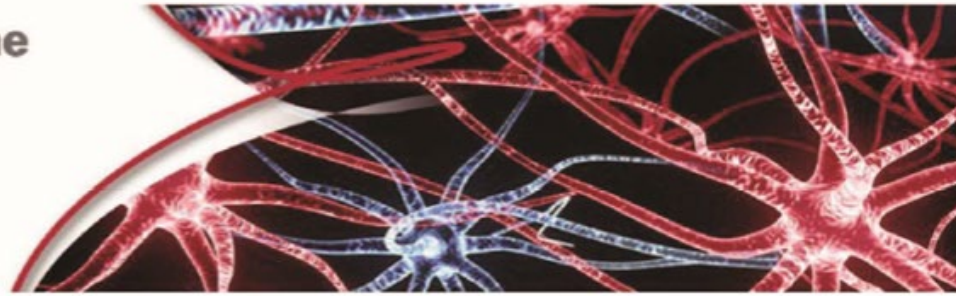


## **Il ruolo del Doppler transcranico nella diagnostica differenziale delle vertigini**

**Antonio Siniscalchi**  
**U.O. di Neurologia e Stroke Unit**  
**Azienda Ospedaliera di Cosenza**



## La Neurologia d'Urgenza: realtà e prospettive

Proprio per definire l'entità e la qualità dell'assistenza erogata dal neurologo in PS/DEA, ANEU ha voluto, con il supporto della SIN, effettuare una *survey* sulle attività dello scorso 21 Novembre 2018 (NEUday 2018) in tutto il territorio nazionale.

Hanno aderito all'iniziativa 93 Neurologie (delle 176 identificate come aperte all'urgenza) nelle quali il personale medico turna sul pronto soccorso dell'ospedale nella veste di consulente, ovvero, in qualche caso (ictus, patologie infiammatorie, neoplastiche) con interventi effettuati nello stesso pronto soccorso e nei reparti che a questo afferiscono. Gli accessi totali in Pronto Soccorso sono stati, nel corso della giornata, 4609 e le consulenze neurologiche effettuate 683 (ovvero circa il 15% di tutti gli accessi), a dimostrazione di una richiesta comunque elevata in un ambito talora autenticamente difficoltoso e nel quale l'expertise del neurologo è dirimente e di autentico supporto al medico d'urgenza.

Dei pazienti valutati dal neurologo in questa survey, la maggior parte era stata identificata, al triage, con **codice verde o giallo** (e di conseguenza era collocabile in una **gravità medio-elevata**), essendo le patologie neurologiche più frequentemente valutate le **malattie cerebrovascolari acute (23,6%)**, le **cefalee (12,1%)**, i **traumi cranici (8,6%)** le **vertigini (7,7%)** le **crisi epilettiche (6,6%)**, i **disturbi di coscienza (4,3%)** e a seguire sintomi psichici, stati confusionali, la preesistenza di una patologia neurologica in anamnesi o infine altre e diverse ragioni.



In merito all'approccio diagnostico specie strumentale, va sottolineato come una indagine "specifica" come la TC cerebrale era già stata effettuata in PS prima della consulenza del neurologo in ben il 61,3% dei casi, restando comunque l'indagine più richiesta anche dallo specialista dopo la visita (22,7% dei casi), mentre un elettroencefalogramma era richiesto nel 9,9%, la risonanza magnetica cerebrale nel 6,6% e l'ecodoppler dei tronchi sopraortici nel 4,6% (le altre indagini, esame del liquor cerebrospinale, esami radiologici tradizionali erano molto meno frequenti ovvero pressochè assenti).

## Rate and Predictors of Serious Neurologic Causes of Dizziness in the Emergency Department

Babak B. Navi, MD; Hooman Kamel, MD; Maulik P. Shah, MD;  
Aaron W. Grossman, MD, PhD; Christine Wong, MD; Sharon N. Poisson, MD, MAS;  
William D. Whetstone, MD; S. Andrew Josephson, MD;  
S. Claiborne Johnston, MD, PhD; and Anthony S. Kim, MD, MAS

Mayo Clin Proc. 2012;87(11):1080-1088

**TABLE 4. Final Diagnoses for 907 Patients Presenting to the Emergency Department With Dizziness<sup>a</sup>**

Diagnosis <sup>b</sup>	907 Patients, No. (%)		
<b>Serious neurologic diseases</b>	<b>49 (5)</b>	Serious cardiac diseases	35 (4)
Ischemic stroke	24 (3)	Arrhythmia	22 (2)
Transient ischemic attack	8 (1)	Hypertensive emergency	10 (1)
Brain neoplasm	6 (1)	Acute coronary syndrome	2 (<1)
Intracerebral hemorrhage	5 (1)	Heart failure exacerbation	1 (<1)
Seizure	4 (<1)	Stable angina	0
Demyelinating disease	2 (<1)	<b>Other medical conditions</b>	<b>119 (13)</b>
Subarachnoid hemorrhage	0	Drug or substance ingestion/withdrawal	46 (5)
Subdural hemorrhage	0	Systemic infection	34 (4)
Epidural hemorrhage	0	Electrolyte disorder	14 (2)
Brain abscess/meningitis	0	Other	11 (1)
<b>Peripheral neurologic diseases</b>	<b>294 (32)</b>	Anemia or gastrointestinal bleeding	10 (1)
Peripheral vertigo NOS	185 (20)	Hypoglycemia	4 (0.4)
BPPV	78 (9)		
Vestibular neuronitis	27 (3)		
Meniere disease	4 (<1)		
<b>Other neurologic diseases</b>	<b>388 (43)</b>		
Dizziness NOS	199 (22)		
<b>Orthostasis/near syncope</b>	<b>121 (13)</b>		
Migraine	37 (4)		
Syncope	20 (2)		
Concussion	11 (1)		
Gait disorder NOS	0		
<b>Psychiatric conditions</b>	<b>22 (2)</b>		
Psychiatric disorder NOS	22 (2)		

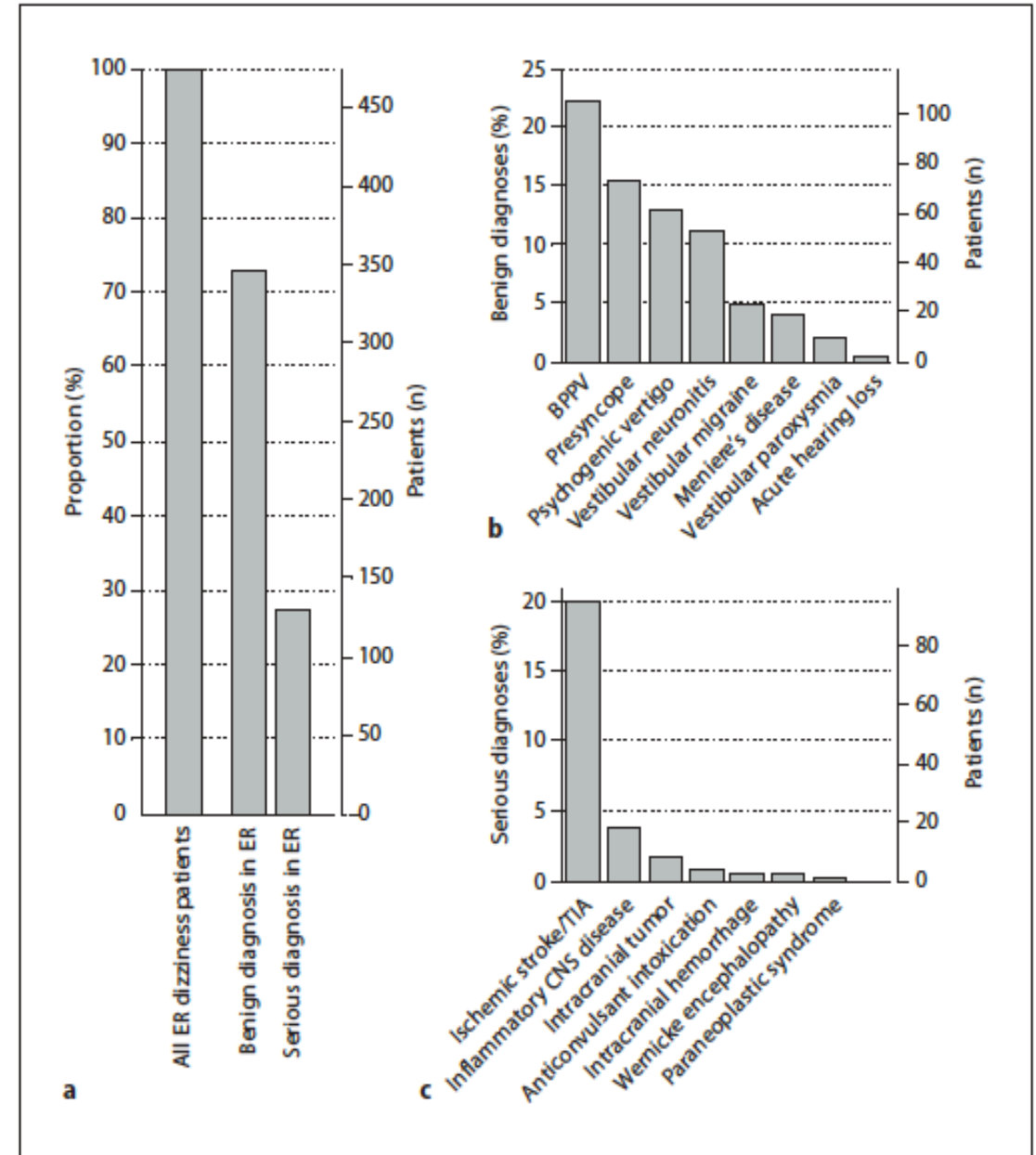
<sup>a</sup>BPPV = benign paroxysmal positional vertigo; NOS = not otherwise specified.

<sup>b</sup>The broad diagnostic categories and individual diagnoses were prespecified.

## Dizziness in the Emergency Room: Diagnoses and Misdiagnoses

Georg Royl<sup>a,b</sup> Christoph J. Ploner<sup>a</sup> Christoph Leithner<sup>a,c</sup>

<sup>a</sup>Department of Neurology, Charité – Universitätsmedizin Berlin, Campus Virchow Klinikum, <sup>b</sup>Center for Stroke Research, and <sup>c</sup>NeuroCure Research Center, Berlin, Germany



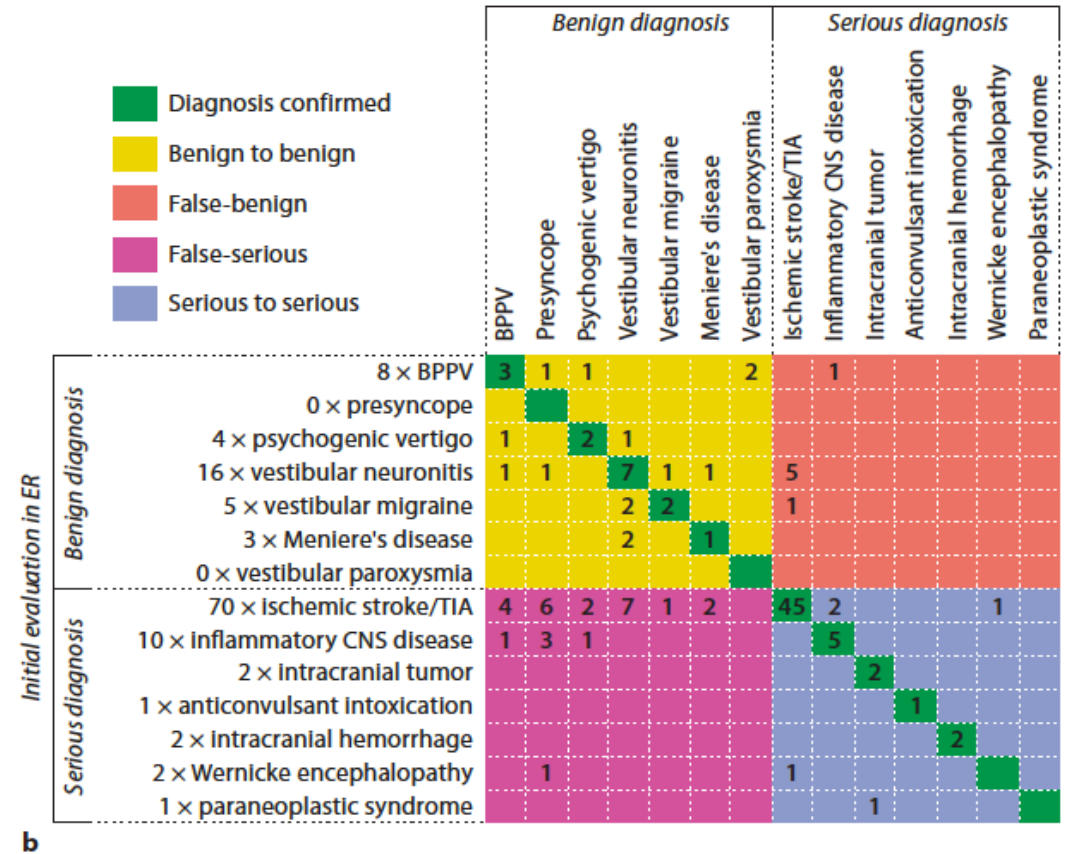
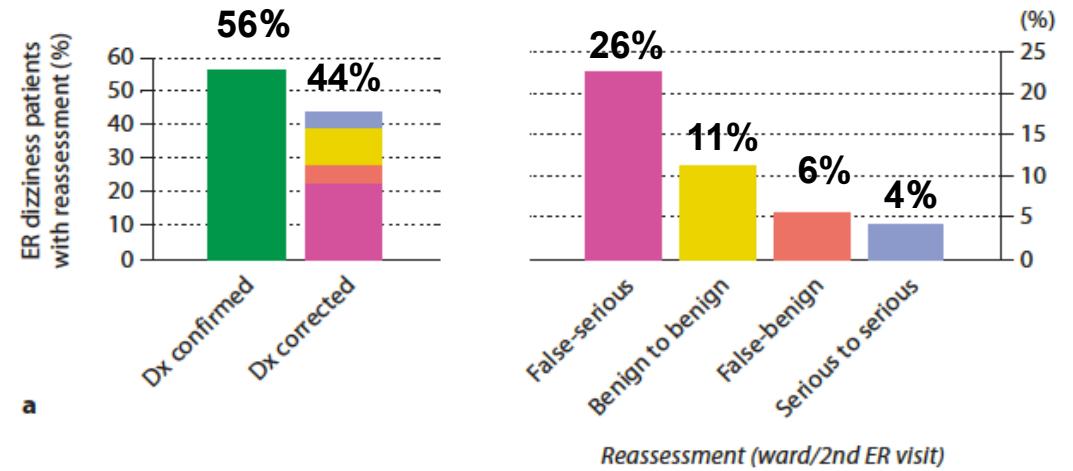
**Fig. 1.** Diagnoses after neurological ER consultation with chief complaint of dizziness. **a** Number of all patients who presented to the ER because of dizziness and proportion of benign and serious diagnoses upon initial neurological ER consultation. **b** Subgroups of benign diagnoses after ER presentation for dizziness. **c** Subgroups of serious diagnoses after ER presentation for dizziness.

# Dizziness in the Emergency Room: Diagnoses and Misdiagnoses

Georg Royl<sup>a,b</sup> Christoph J. Ploner<sup>a</sup> Christoph Leithner<sup>a,c</sup>

<sup>a</sup>Department of Neurology, Charité – Universitätsmedizin Berlin, Campus Virchow Klinikum, <sup>b</sup>Center for Stroke Research, and <sup>c</sup>NeuroCure Research Center, Berlin, Germany

**Fig. 2.** Revisions of neurological ER diagnosis. A follow-up was available in 124 of 475 patients (26%). **a** Proportion of patients with confirmed and corrected diagnosis (left) as well as subgroups of diagnosis corrections (right). **b** Individual tentative diagnoses made in the ER after presentation for dizziness (vertical axis) and number and sort of revisions made after reassessment by hospital admission or repeated ER visit (horizontal axis). Dx = Diagnosis.



**Incidence and Outcome of Subtypes of  
Ischaemic Stroke: Initial Results from the  
North East Melbourne Stroke Incidence Study  
(NEMESIS)**Helen M. Dewey<sup>a,b</sup> · Jonathan Sturm<sup>a</sup> · Geoffrey A. Donnan<sup>a,b</sup>  
Richard A.L. Macdonell<sup>a,b</sup> · John J. McNeil<sup>a</sup> · Amanda G. Thrift<sup>a,c</sup>**Posterior circulation ischemic stroke—a review part II: imaging  
and acute treatment**Marco Sparaco<sup>1</sup> · Ludovico Ciulli<sup>2</sup> · Andrea Zini<sup>3</sup>Check for  
updates**Outcome at 30 Days in the New England Medical  
Center Posterior Circulation Registry**Thomas A. Glass, PhD; Patricia M. Hennessey; Ladislav Pazdera, MD; Hui-Meng Chang, MD;  
Robert J. Wityk, MD; L. Dana Dewitt, MD; Michael S. Pessin, MD†; Louis R. Caplan, MD

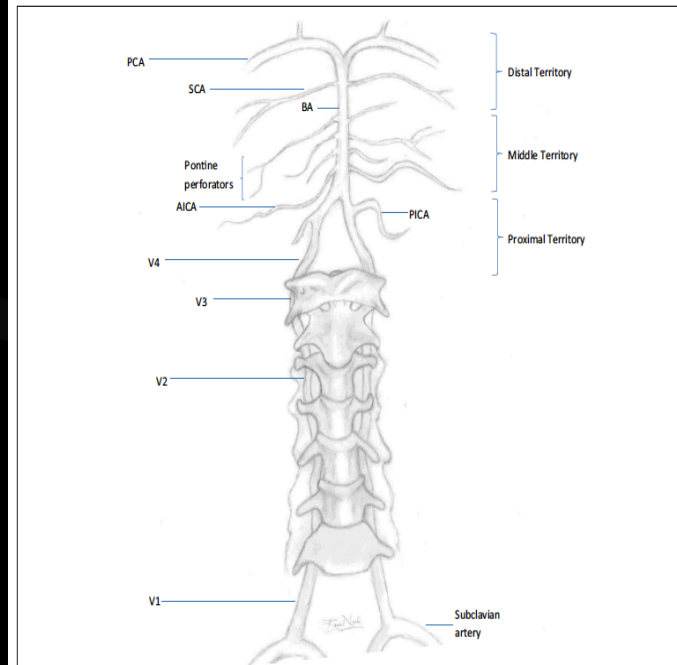
Arch Neurol. 2002;59:369-376

# Ictus ischemico del circolo posteriore

- L'ischemia del circolo posteriore rappresenta circa 20–25% di tutti gli ictus ischemici con un'incidenza annuale del 18 per 100.000 persone all'anno ed è un'importante causa di disabilità e mortalità
- Pazienti con ictus ischemico nel territorio dell'arteria basilare hanno una probabilità 5 volte maggiore di avere un esito sfavorevole indipendentemente da altri fattori.

# La diagnosi errate Ictus circolo posteriore

- Inaccurata diagnosi clinica (non visitati da un neurologo)
- Eccessiva dipendenza della TC cranio
- Variabilità di sintomi e segni
- Scale di valutazione



**FIGURE 1 | Vertebral-basilar system.** PCA, posterior cerebral artery; SCA, superior cerebellar artery; BA, basilar artery; AICA, anterior inferior cerebellar artery; PICA, posterior inferior cerebellar artery; V1–V4, segments of the vertebral artery. Proximal territory, areas supplied by the intracranial VAs and PICAs up to the VB junction; middle territory, BA and AICAs up to the SCAs; distal territory, rostral BA, SCAs, and PCAs.

## Diagnosis and initial management of cerebellar infarction

Jonathan A Edlow, David E Newman-Toker, Sean I Savitz

Clinical finding	n (%)	Comments
<b>Prior event</b>		
History of posterior circulation TIA	65 of 295 (22)	TIA suggests the need for rapid work-up and treatment, as with anterior circulation TIA
<b>Symptoms</b>		
Dizziness or vertigo	404 of 557 (73)	Whether the patient specifically describes vertigo rather than dizziness does not alter the likelihood of stroke
Nausea or vomiting	298 of 557 (54)	Nausea or vomiting can occur without dizziness and can sometimes be posturally provoked
Gait disturbance	186 of 389 (48)	The inability to walk independently suggests a central rather than a peripheral cause
Headache	207 of 557 (37)	Location and quality of headache are not diagnostic; abrupt onset can mimic haemorrhage; head or neck pain in younger patients should prompt consideration of vertebral dissection
Slurred speech	122 of 417 (29)	Slurred speech is more commonly the result of anterior circulation strokes than posterior circulation strokes; as a symptom, slurred speech must be distinguished from partial aphasia
<b>Signs</b>		
Limb ataxia	298 of 513 (58)	Limb ataxia (clumsy, wavering, dys synergic movements) and dysmetria (pastpointing or mismeasured reaching) cluster together clinically and are coded together
Truncal ataxia	263 of 513 (51)	Truncal ataxia is typically assessed with the patient seated at the bedside (or in an armless chair) and arms folded
Dysarthria	204 of 447 (46)	Anterior circulation strokes might be more likely to produce labial (facial) dysarthria, and posterior circulation strokes more likely to produce lingual and guttural dysarthria; excludes a peripheral cause in a patient with dizziness
Nystagmus	226 of 513 (44)	Nystagmus that is direction-changing or vertical strongly suggests a central rather than a peripheral cause
Confusion or somnolence	116 of 447 (26)	Altered mental status is more common in strokes of the superior cerebellar artery, perhaps because of its association with top-of-the-basilar ischaemia that extends to the paramedian thalamus and medial temporal lobes
Coma	14 of 447 (3)	Frank coma typically suggests either mid-basilar occlusion or the onset of secondary complications (direct brainstem compression or obstructive hydrocephalus with herniation)
<p>Numbers were tabulated from several studies.<sup>2,4,6,7,11,19,52</sup> Patients' data were pooled independent of infarct areas. When data were provided in sufficient detail that enabled the distinction of patients with pure cerebellar stroke from those with brainstem association, the latter patients were excluded. Therefore, the denominators are not the same for each category. However, some of these numbers might have included some patients who had associated brainstem infarction. TIA—transient ischaemic attack.</p>		

**Table 2: Frequency of common published clinical findings of cerebellar infarction listed in order of descending frequency**

## Asterixis as a Presentation of Cerebellar Ischemic Stroke

Antonio Siniscalchi, MD\*‡

Luca Gallelli, MD, PhD\*\*

Olindo Di Benedetto, MD‡

Giovambattista De Sarro, MD†

\*Department of Neurology, "Annunziata" Hospital, Cosenza, Italy

†Department of Experimental and Clinical Medicine, University Magna Grecia of Catanzaro, Regional Pharmacovigilance Center, Mater Domini University Hospital, Catanzaro, Italy

‡Department of Neuroradiology, "Annunziata" Hospital, Cosenza, Italy

Asterixis is not yet considered a common neurological sign of cerebellum infarction, and the pathogenic mechanism for asterixis remains elusive. We report a 58-year-old male with moderate hypertension who presented to our emergency department for acute headache in both cervical and occipital regions of the left side. About 2 hours later the patient developed ipsilateral asterixis in the upper left limb; 3 days later the asterixis disappeared. Magnetic resonance imaging of the brain disclosed cerebellar infarctions at the left superior cerebellar artery. In conclusion, we observed that a transitory asterixis associated with ipsilateral headache can be an initial clinical manifestation of ipsilateral cerebellar infarctions in the superior cerebellar artery area. [West J Emerg Med. 2012;13(6):507-508]

- Descriviamo il caso di un uomo di 58 anni con ipertensione moderata che si è presentato al nostro pronto soccorso per vertigine e cefalea acuta in regione occipitale del lato sinistro.
- Circa 2 ore dopo il paziente ha sviluppato un'asterixis omolaterale nell'arto superiore sinistro
- 3 giorni dopo l'asterixis scompare spontaneamente

## Asterixis as a Presentation of Cerebellar Ischemic Stroke

Antonio Siniscalchi, MD\*\*

\*Department of Neurology, "Annunziata" Hospital, Cosenza, Italy

Luca Gallelli, MD, PhD\*\*

†Department of Experimental and Clinical Medicine, University Magna Grecia of

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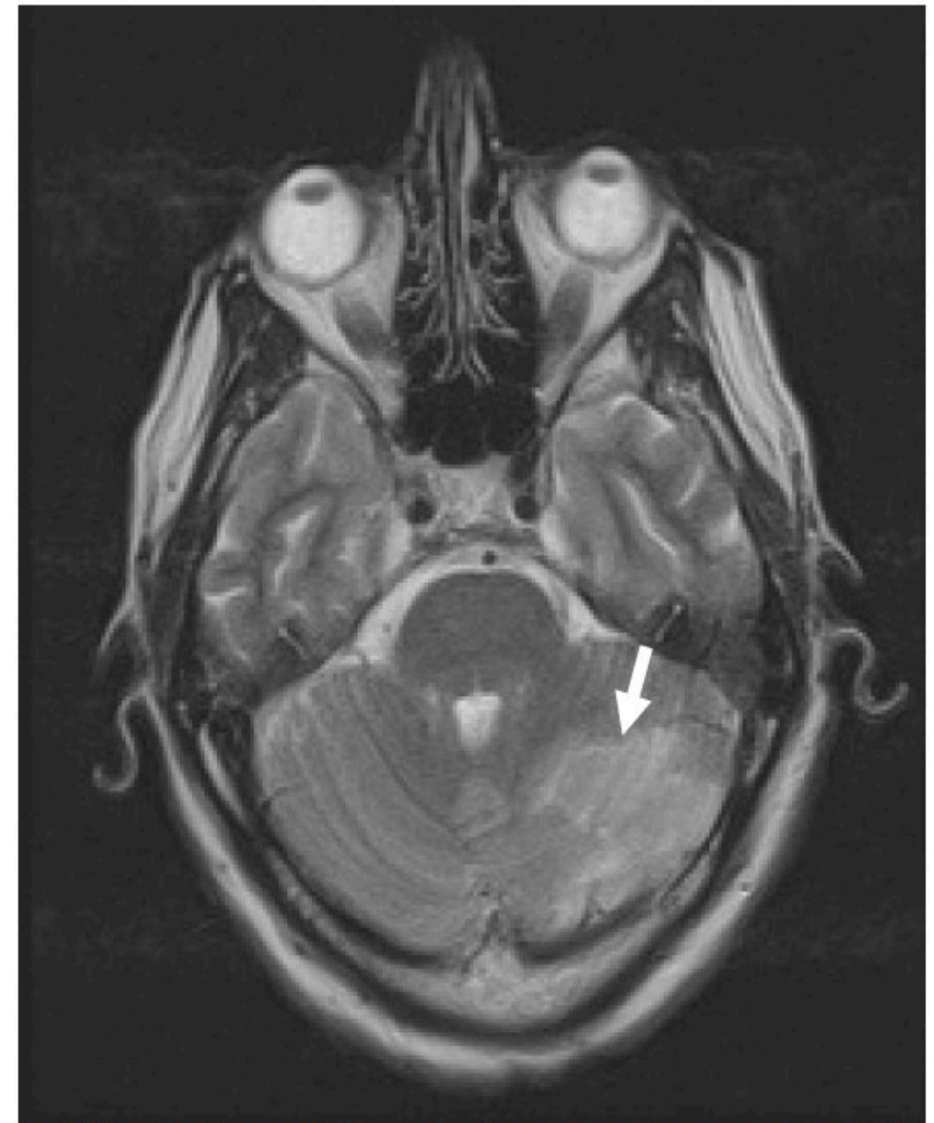
Catanzaro, Regional Pharmacovigilance Center, Mater Domini University Hospital,

Giovambattista De Sarro, MD†

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**Figure.** T2-weighted axial magnetic resonance imaging of the brain disclosed cerebellar infarctions in the left superior cerebellar artery region (arrow).

# Asterixis after unilateral stroke: Lesion location of 30 patients

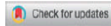
**Article abstract**—The author describes 30 consecutive patients with unilateral stroke who had asterixis on presentation. The lesion location was as follows: thalamus in 19 (mostly, ventrolateral nucleus), frontal lobe in six, lenticulocapsular area in one, midbrain in two, and the cerebellum in two patients. Four patients had bilateral asterixis, and two patients with cerebellar lesions had ipsilateral asterixis. The asterixis may be caused by the abnormal control of arm posture maintenance due to functional dysregulation of the brainstem–spinal tracts from the cerebello–brainstem–thalamo–frontal lobe system.

NEUROLOGY 2001;56:533–536

Jong S. Kim, MD

**Table Demographic and clinical features of the patients**

Patient no./sex/age, y	Neurologic deficits					Duration of asterixis, d	Site	Presumed stroke mechanism
	Motor*	Sensory*	Limb ataxia*	Gait ataxia	Other			
1/M/62	V–	Paresthesia only	Mild	Mild		9	Thalamus	SVI
2/M/71	IV	Mild	Mild	Severe		>3	Thalamus	ICH
3/F/69	V–	Mild	Mild	Mild	Dysarthria	2	Thalamus	SVI
4/F/72	IV	Moderate	Severe	Severe	Dysarthria/facial palsy	3	Thalamus	SVI
5/F/66	V–	None	None	Severe	Somnolence, decreased memory	8	Thalamus	LVI
6/F/77	III	Mild	Mild	Severe	Dysarthria/facial palsy	7	Thalamus	ICH
7/F/77	None	Mild	Severe	Severe	Dysarthria	3	Thalamus	SVI
8/M/61	IV	None	Mild	Mild	VFD	6	Thalamus	CE
9/F/58	IV	None	Mild	Mild	Somnolence	7	Thalamus	ICH
10/M/59	V–	Mild (PP, PO only)	Mild	Severe		3	Thalamus	LVI
11/M/66	V–	Severe (PO only)	Severe	Severe	Dementia, VFD	4	Thalamus	LVI
12/F/60	V–	Mild	Mild	Severe		2	Thalamus	ICH
13/F/71	IV	Mild	Mild	Severe	Dysarthria/facial palsy	>7	Thalamus	ICH
14/F/65	V–	Mild	None	Mild		4	Thalamus	SVI
15/F/72	V–	Mild	Mild	Mild		3	Thalamus	SVI
16/F/69	V–	Mild	None	Mild	Confusion, decreased memory	>9	Thalamus	ICH
17/M/62	V–	Mild	Mild	Mild	VFD	3	Thalamus	LVI
18/M/64	IV	Mild	Mild	Severe	Facial palsy	4	Thalamus	
19/M/57	V–	Moderate	Mild	Severe	Somnolence	5	Thalamus	ICH
20/F/59	V–	None	None	UC	Apathetic, transcortical aphasia	3	Frontal	LVI
21/M/47	V–	Mild	None	UC	Apathetic, stuttering	3	Frontal	LVI
22/M/55	IV	Mild (PO only)	None	UC	Apathetic, stuttering, alien hand sign	7	Frontal	LVI
23/M/70	None	None	None	None	Apathetic	2	Frontal	LVI
24/M/68	V–	None	None	None		2	Frontal	LVI
25/M/83	V–	None	None	None	Dysarthria/facial palsy	5	Frontal	Unknown
26/M/70	V–	Mild	None	UC	Dysarthria/facial palsy	3	Striatum	ICH
27/M/56	V	Mild	Mild	Severe	3rd nerve palsy	3	Midbrain	LVI
28/M/62	None	Mild	Mild	Severe		5	Midbrain	LVI
29/M/75	None	None	Severe	Severe	Dysarthria	12	Cerebellum	CE
30/M/78	V–†	None	Mild	Severe	Dysarthria	7	Cerebellum	CE



## The National Institutes of Health Stroke Scale: Its Role in Patients with Posterior Circulation Stroke

Antonio Siniscalchi<sup>a</sup>, Roman Sztajzel<sup>b</sup>, Giovanni Malferrari<sup>c</sup>, and Luca Gallelli<sup>d</sup>

<sup>a</sup>Department of Neurology, "Annunziata" Hospital, Cosenza, Italy; <sup>b</sup>Department of Neurology, University Hospital of Geneva, Geneva, Switzerland; <sup>c</sup>Stroke Unit, Department of Neurology, Santa Maria Nuova Hospital, Reggio Emilia, Italy; <sup>d</sup>Department of Health Science, School of Medicine, University of Catanzaro, Clinical Pharmacology and Pharmacovigilance Unit, Mater Domini University Hospital, Catanzaro, Italy

**In conclusion, NIHSS is only poorly representative of the clinical deficit in PC stroke. In fact some important clinical features receive no score at all (e.g., diplopia, dysphagia, gait instability, hearing, and nystagmus). Physicians must consider that patients presenting on emergency department with a low NIHSS may develop a PC stroke.**

## Comparison of eight prehospital stroke scales to detect intracranial large-vessel occlusion in suspected stroke (PRESTO): a prospective observational study

Martijne H C Duvekot <sup>1</sup>, Esmee Venema <sup>2</sup>, Anouk D Rozeman <sup>3</sup>, Walid Moudrous <sup>4</sup>, Frédérique H Vermeij <sup>5</sup>, Marileen Biekart <sup>6</sup>, Hester F Lingsma <sup>7</sup>, Lisette Maasland <sup>8</sup>, Annemarie D Wijnhoud <sup>9</sup>, Laus J M M Mulder <sup>10</sup>, Kees C L Alblas <sup>5</sup>, Roeland P J van Eijkelenburg <sup>11</sup>, Bianca I Buijck <sup>12</sup>, Jeannette Bakker <sup>13</sup>, Aarnout S Plaisier <sup>14</sup>, Jan-Hein Hensen <sup>15</sup>, Geert J Lycklama À Nijeholt <sup>16</sup>, Pieter Jan van Doormaal <sup>17</sup>, Adriaan C G M van Es <sup>18</sup>, Aad van der Lugt <sup>17</sup>, Henk Kerkhoff <sup>3</sup>, Diederik W J Dippel <sup>19</sup>, Bob Roozenbeek <sup>20</sup>, PRESTO investigators

1. Rapid Arterial occlusion Evaluation (RACE),
2. Los Angeles Motor Scale (LAMS),
3. Cincinnati Stroke Triage Assessment Tool (C-STAT),
4. Gaze-Face-Arm-Speech-Time (G-FAST),
5. Prehospital Acute Stroke Severity (PASS),
6. Cincinnati Prehospital Stroke Scale (CPSS),
7. Conveniently-Grasped Field Assessment Stroke Triage (CG-FAST)
8. the FAST-PLUS (Face-Arm-Speech-Time plus severe arm or leg motor deficit) test.

Le scale per l'ictus preospedaliero rilevano aLVO con una precisione da accettabile a buona. RACE, G-FAST e CG-FAST sono le scale preospedaliere con le migliori prestazioni tra le otto scale testate e si avvicinano alle prestazioni del NIHSS valutato dal medico. Sono necessari ulteriori studi per indagare se l'uso di queste scale nelle strategie di trasporto regionale può ottimizzare i risultati dei pazienti con ictus ischemico.

# Factors Associated with the Misdiagnosis of Cerebellar Infarction

Yoko Masuda, MD,\* Hideaki Tei, MD,† Satoru Shimizu, PhD,‡ and Shinichiro Uchiyama, MD\*

## Results

Thirty-two of 114 (28%) patients were misdiagnosed on admission. At the first visit, 30 of 32 (94%) misdiagnosed patients were seen by physicians who were not neurologists. Twenty-four of 32 (75%) misdiagnosed patients were screened only by computed tomographic (CT) scans of the brain. Only 3 (13%) patients were found to have lesions in the cerebellum on CT. Two of the 3 patients were diagnosed with an old infarction, and another patient was not found to have any responsible lesion. However, pa-

**Table 1.** Relationships between misdiagnosis and neurologic deficits in patients with acute cerebellar infarction

Neurologic deficits	Misdiagnosis		$\beta$ coefficient	OR (95% CI)	P value*
	Yes (n = 32)	No (n = 82)			
Vertigo	28 (88%)	65 (79%)	.3238	1.38 (.71-2.99)	.371
Headache	17 (53%)	35 (43%)	.2631	1.30 (.84-2.04)	.244
Disturbance of consciousness	7 (22%)	19 (23%)	.2851	1.33 (.73-2.43)	.347
Dysarthria	8 (25%)	39 (48%)	-.6332	.53 (.31-.86)	.014
Nystagmus	18 (56%)	39 (48%)	.1834	1.20 (.77-1.90)	.422
Ataxia	24 (75)	53 (65)	.2780	1.32 (.81-2.23)	.275

\*Multivariable model.

# Factors Associated with the Misdiagnosis of Cerebellar Infarction

Yoko Masuda, MD,\* Hideaki Tei, MD,† Satoru Shimizu, PhD,‡  
and Shinichiro Uchiyama, MD\*

## Conclusioni

Pazienti di età inferiore a 60 anni nei pazienti con dissezione dell'arteria vertebrale hanno maggiori probabilità di avere un infarto cerebellare diagnosticati erroneamente da medici diversi dai neurologi.

## Extent of Hypoattenuation on CT Angiography Source Images Predicts Functional Outcome in Patients With Basilar Artery Occlusion

Volker Puetz, MD; P.N. Sylaja, MD; Shelagh B. Coutts, MD; Michael D. Hill, MD, MSc; Imanuel Dzialowski, MD; Pia Mueller, MD; Ulf Becker, MD; Gabriele Urban; Christine O'Reilly, BSc; Philip A. Barber, MD; Pranshu Sharma, MD; Mayank Goyal, MD; Georg Gahn, MD; Ruediger von Kummer, MD; Andrew M. Demchuk, MD

(*Stroke*. 2008;39:2485-2490.)

van Seeters et al. *BMC Neurology* 2014, 14:37  
<http://www.biomedcentral.com/1471-2377/14/37>



STUDY PROTOCOL

Open Access

### Prediction of outcome in patients with suspected acute ischaemic stroke with CT perfusion and CT angiography: the Dutch acute stroke trial (DUST) study protocol

Tom van Seeters<sup>1\*</sup>, Geert Jan Biessels<sup>2</sup>, Irene C van der Schaaf<sup>1</sup>, Jan Willem Dankbaar<sup>1</sup>, Alexander D Horsch<sup>1,3</sup>, Merel JA Luitse<sup>2</sup>, Joris M Niesten<sup>1</sup>, Willem PTM Mali<sup>1</sup>, L Jaap Kappelle<sup>2</sup>, Yolanda van der Graaf<sup>2</sup>, and Birgitta K Velthuis<sup>1</sup> on behalf of the DUST investigators

Neurological Sciences (2019) 40:2007–2015  
<https://doi.org/10.1007/s10072-019-03936-x>

REVIEW ARTICLE

### Posterior circulation ischemic stroke—a review part II: imaging and acute treatment

Marco Sparaco<sup>1</sup> • Ludovico Ciolli<sup>2</sup> • Andrea Zini<sup>3</sup>



# Indagini strumentali nei pazienti con Ictus ischemico del circolo posteriore

- Tomografia computerizzata (TC),
- Risonanza magnetica nucleare (MRI)
- Ecografia Doppler (TCD/TCCD) possono essere utilizzate nei casi acuti per valutare i pazienti con ictus del circolo posteriore.

## The role of transcranial Doppler ultrasonography in differential diagnosis of vertigo in the Emergency Department

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<sup>1</sup>Stroke Unit, Department of Neurology, "Annunziata" Hospital, Cosenza; <sup>2</sup>Stroke Unit, Department of Neurology, Local Health Authority - IRCCS, Reggio Emilia, Italy



## Posterior circulation ischemic stroke—a review part II: imaging and acute treatment

Marco Sparaco<sup>1</sup>  • Ludovico Ciolli<sup>2</sup> • Andrea Zini<sup>3</sup>

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## MicroV Technology to Improve Transcranial Color Coded Doppler Examinations

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- La neurosonologia ci permette di studiare le arterie del circolo posteriore intracraniche ed extracraniche. Il Doppler possono essere utilizzati per dimostrare l'ostruzione o dissezioni dell'arterie (PCA, VA, BA, PICA, SCA). Tuttavia, questa indagine ha capacità limitate per visualizzare il segmento V2 all'interno dei fori trasversali. Nelle stesse condizioni, il Doppler transcranico (TCD) può mostrare lesioni occlusive vascolari intracraniche che interessano il segmento V3 e V4 dei VA, il BA.
- Tuttavia, queste indagini dipendono dall'operatore meno sensibile nella diagnosi della malattia del PC rispetto a MRA o CTA e sono raramente utilizzati come unica o primaria indagine per la valutazione di ictus PC.
- Tuttavia, possono essere comunque utili in caso di controindicazioni agli agenti di contrasto (cioè, insufficienza renale avanzata e allergia a mezzi di contrasto a base di iodio) e negli ospedali periferici che non disponiamo di strutture di imaging avanzate per selezionare i pazienti da essere indirizzati a centri stroke degli HB.

[Diagnostic Test Accuracy Review]

## Transcranial Doppler sonography for detecting stenosis or occlusion of intracranial arteries in people with acute ischaemic stroke

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**Authors' conclusions:** This review provides evidence that TCD or TCCD, administered by professionals with adequate experience and skills, can provide useful diagnostic information for detecting stenosis or occlusion of intracranial vessels in people with acute ischaemic stroke, or guide the request for more invasive vascular neuroimaging, especially where CT or MR-based vascular imaging are not immediately available. More studies are needed to confirm or refute the results of this review in a larger sample of stroke patients, to verify the role of contrast medium and to evaluate the clinical advantage of the use of ultrasound.

# The role of transcranial Doppler ultrasonography in differential diagnosis of vertigo in the Emergency Department

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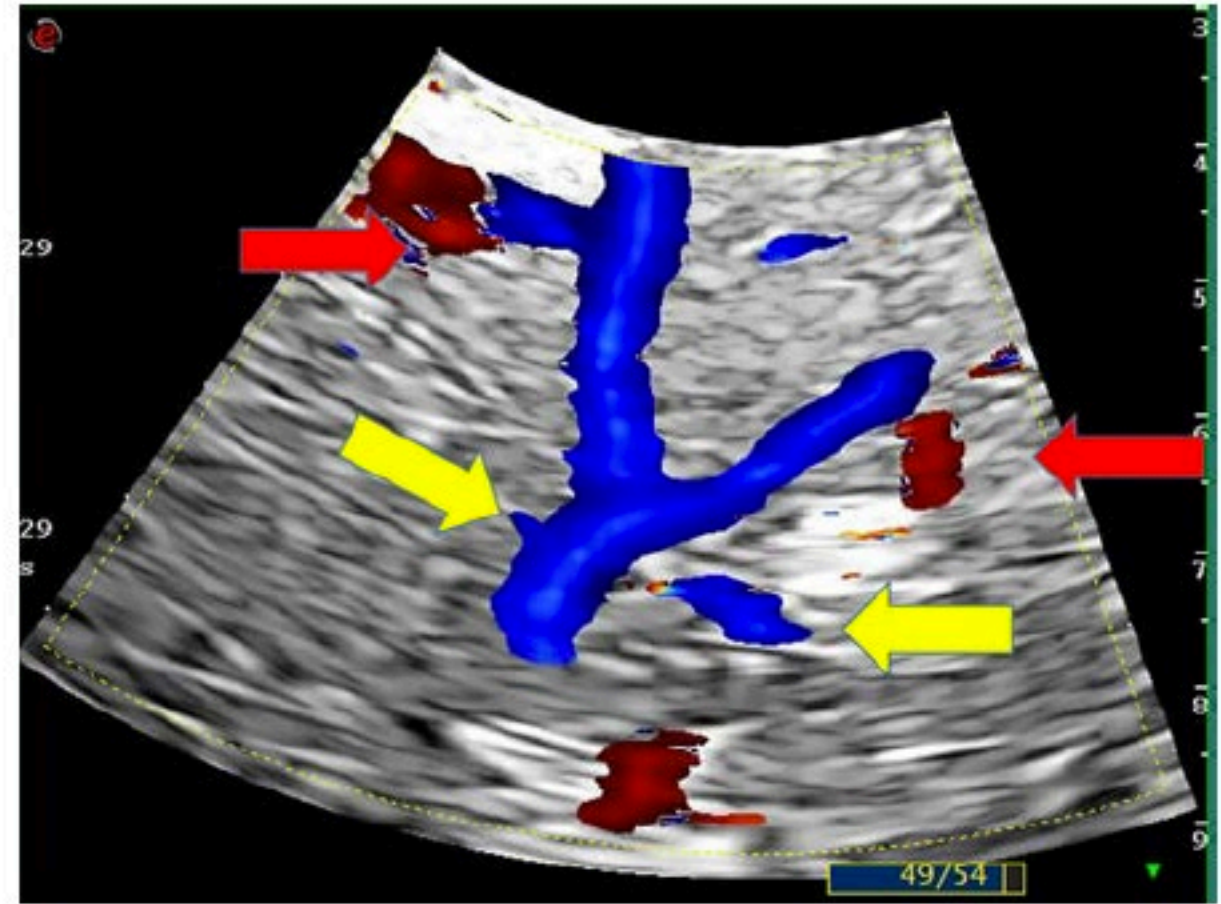
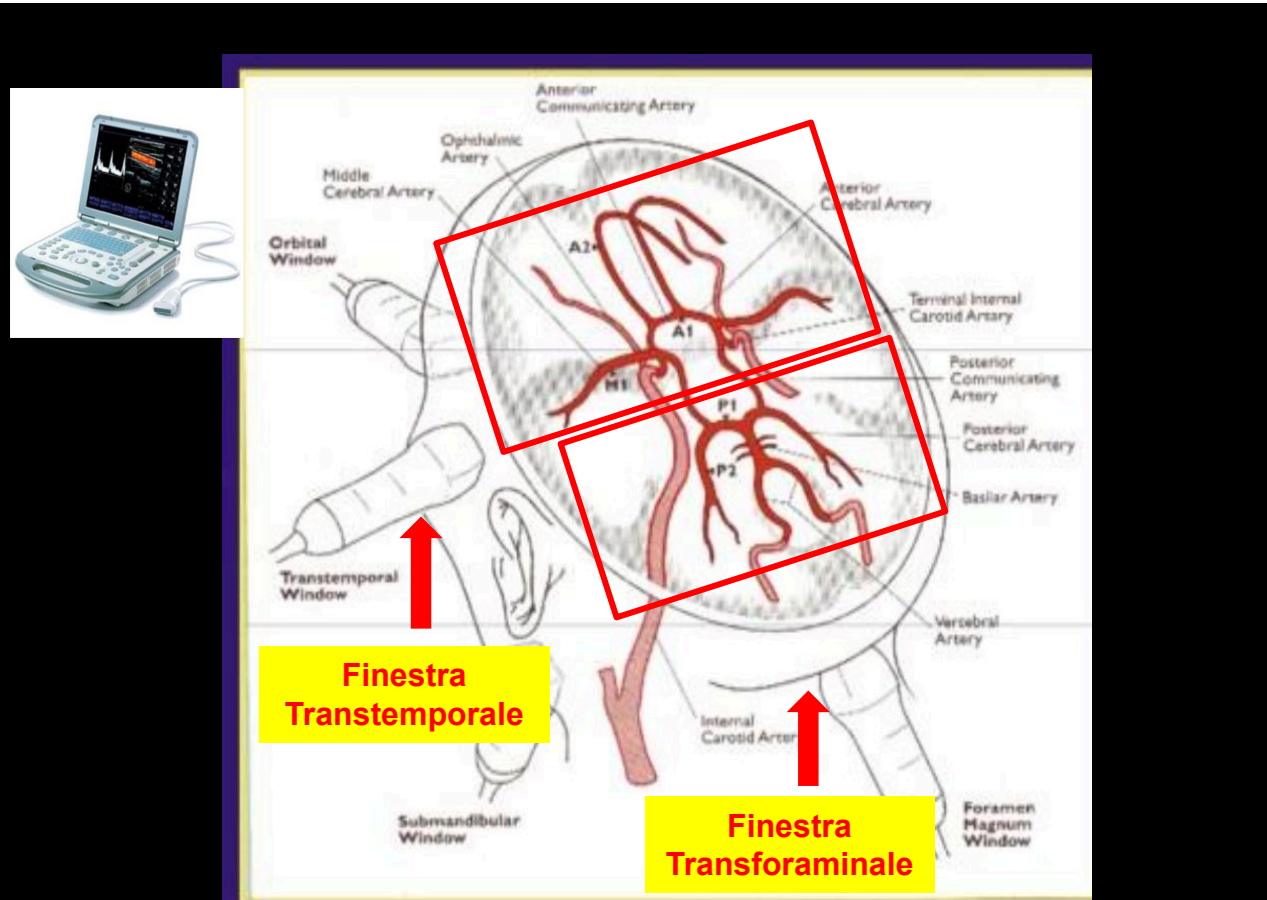


Figure 1. Transcranial color Doppler, transforaminal insonation plane: color-mode imaging of two vertebral arteries and proximal basilar artery. Red arrows correspond to the posterior inferior cerebellar arteries (PICA) arising laterally from the vertebral arteries; yellow arrows indicate anterior inferior cerebellar arteries (AICA) from the proximal basilar artery.

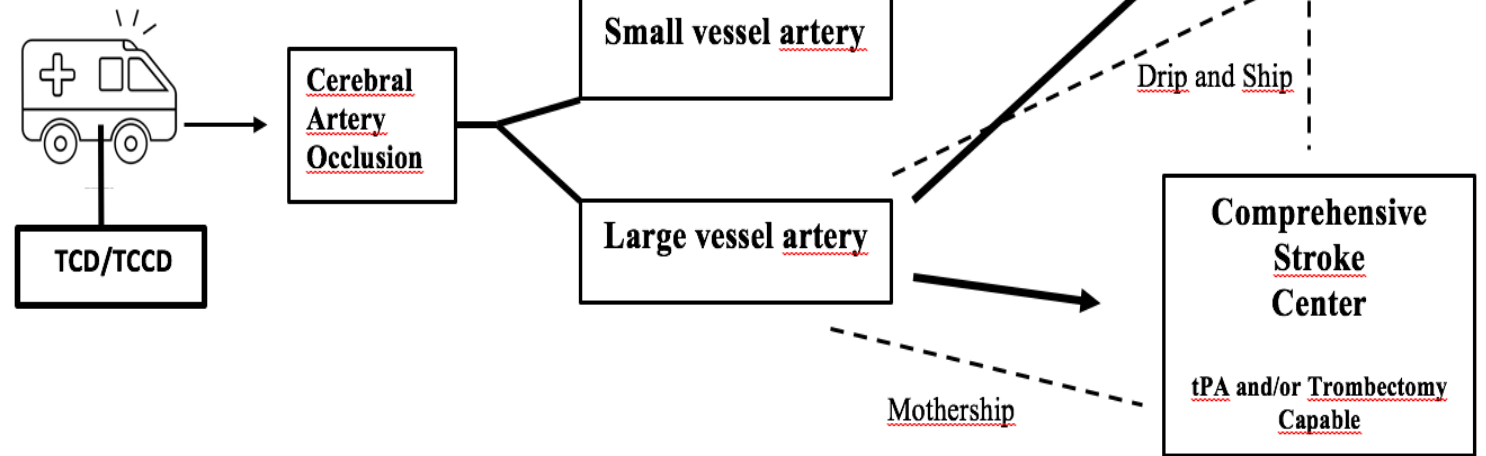
# Transcranial Doppler Ultrasonography in Pre-hospital Management of Stroke: can it make a Difference?

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## Graphical Abstract

### Pre-Hospital Condition

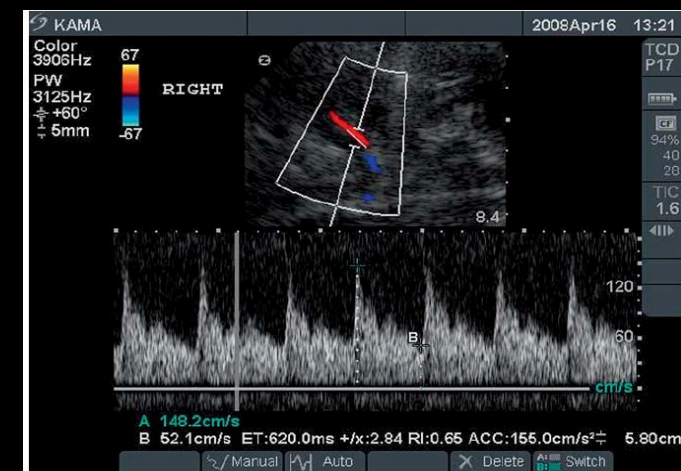


# Transcranial Ultrasound from Diagnosis to Early Stroke Treatment

## 1. Feasibility of Prehospital Cerebrovascular Assessment

Thilo Hölscher<sup>a</sup> Felix Schlachetzki<sup>b</sup> Markus Zimmermann<sup>c</sup> Wolfgang Jakob<sup>c</sup>  
Karl Peter Ittner<sup>c</sup> Johann Haslberger<sup>d</sup> Ulrich Bogdahn<sup>b</sup> Sandra Boy<sup>b</sup>

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**Table 1.** Total number of patients, time to arrival, time to ultrasound study, bone window yes/no, duration of ultrasound study and initial working diagnosis

Patient	Time to arrival min	Time to ultrasound min	Bone window	Duration of ultrasound min	Working diagnosis
1	16	7	yes	2	MI
2	27	15	yes	1	renal failure
3	14	15	yes	2	MI
4	11	9	no	1	seizure
5	5	24	yes	1	trauma
6	13	21	yes	3	trauma
7	10	3	yes	3	MI
8	9	11	yes	1	seizure
9	8	5	no	1	acute abdomen
10	24	20	yes	2	CHF
11	20	11	yes	1	stroke
12	9	12	no	1	MI
13	5	10	yes	5	stroke
14	5	17	yes	3	stroke
15	3	15	no	2	trauma
16	16	9	yes	3	back pain
17	25	10	yes	2	stroke
18	13	5	yes	2	trauma
19	3	5	yes	2	seizure
20	7	8	yes	1	AOD
21	20	20	no	1	trauma
22	11	12	yes	2	CHD
23	13	5	no	1	stroke
24	14	7	yes	2	MI
25	16	7	yes	2	MI

MI = Myocardial infarction; CHF = congestive heart failure; AOD = aortic occlusive disease; CHD = coronary heart disease.

## CASE REPORT

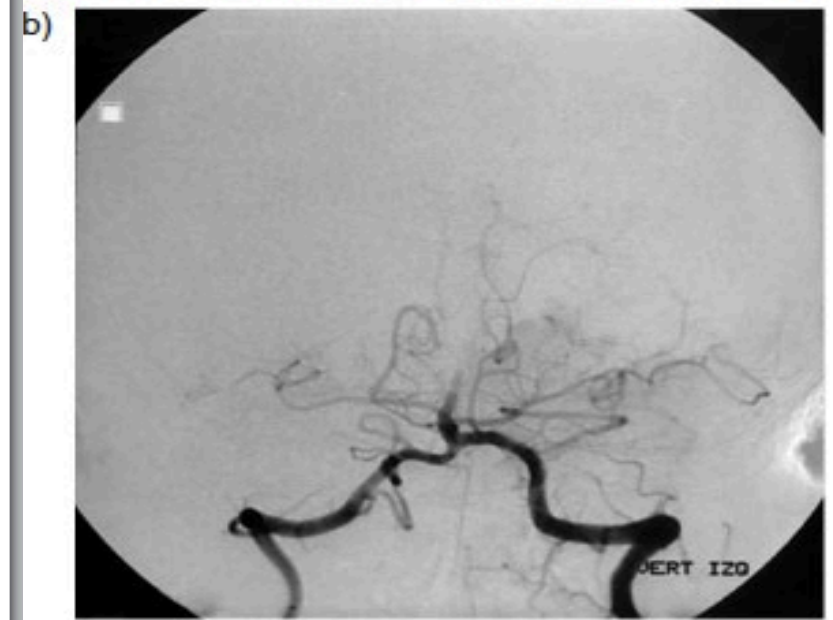
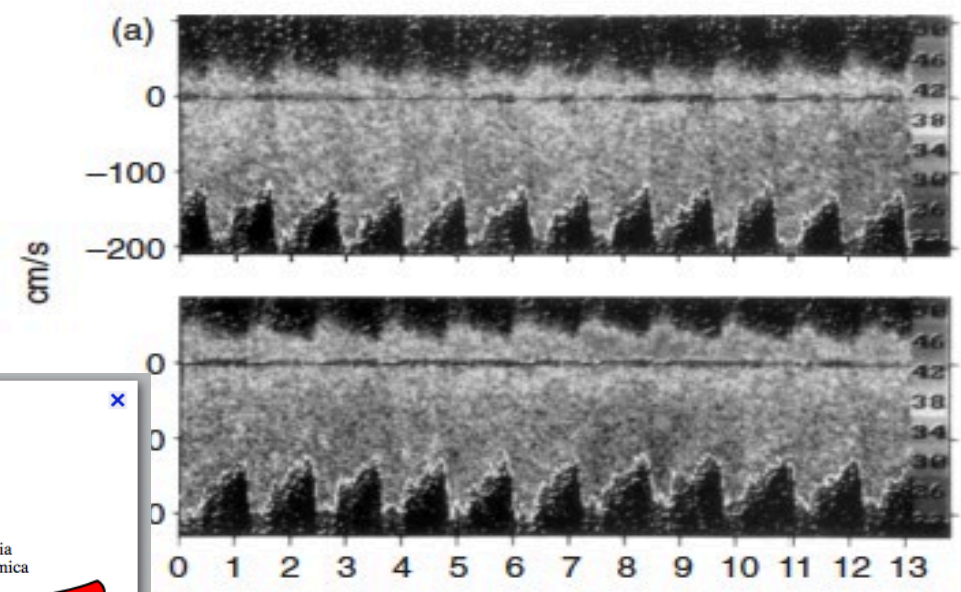
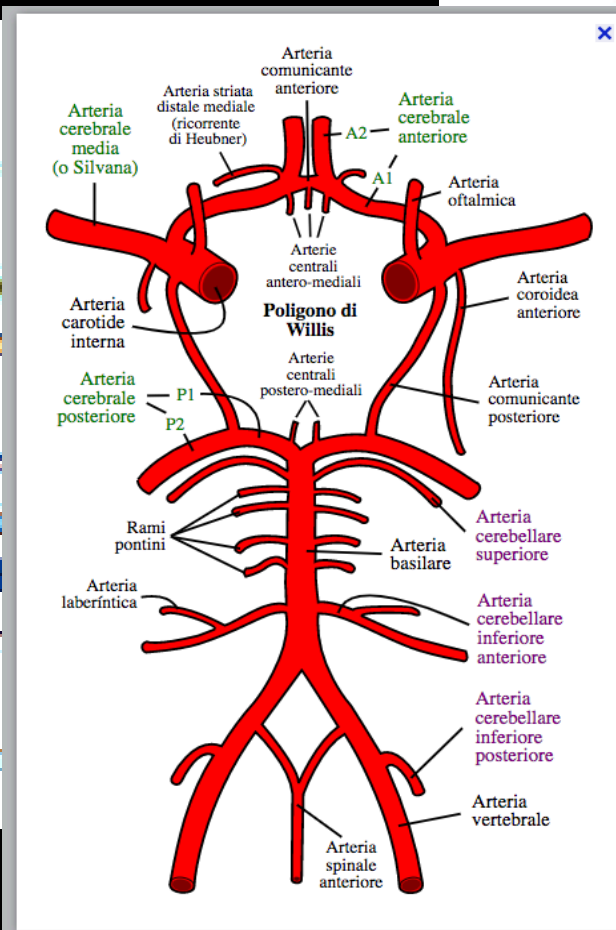
### 'Herald hemiparesis' of basilar artery occlusion: early recognition by transcranial Doppler ultrasound

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## Case report

MC is a 34-year-old female who has suffered migraine (without previous aura) since she was 10 years. Oral contraceptives were used by the subject for 10 years. She has never used triptans. No cardiovascular risk factor was present. She was referred to our hospital because of a sudden occipital headache with nausea and vomiting, for some minutes later by a severe dysarthria and right hemiparesis. Upon arriving at the emergency room, neurological examination assessed the deficit with total resolution two hours after the onset of symptoms.



(a) TCD showing an ortograde flow in both posterior communicating arteries with elevated velocities. (b) A cerebral angiography, confirming the basilar artery occlusion.

# Utility of Screening for Cerebral Vasospasm Using Digital Subtraction Angiography

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Michael R. Chicoine, MD; Keith M. Rich, MD; Ralph G. Dacey Jr, MD; Ian G. Dorward, MD;  
Colin P. Derdeyn, MD; Christopher J. Moran, MD; DeWitte T. Cross III, MD;  
Gregory J. Zipfel, MD; Rajat Dhar, MD

ORIGINAL RESEARCH

Results of a national cerebrovascular neurosurgery survey on the management of cerebral vasospasm/delayed cerebral ischemia

Ketan R. Bulsara,<sup>1</sup> Murat Günel,<sup>1</sup> Sepideh Amin-Hanjani,<sup>2</sup> Pen Roc Chen,<sup>3</sup>  
E Sander Connolly,<sup>4</sup> Robert M Friedlander<sup>5</sup>

## Utilità' del TCD/TCCD rispetto alla Angio-Tc e Angiografia nel vasospasmo cerebrale

- Sebbene vi sia disaccordo sulla sensibilità, specificità e affidabilità interosservatore di TCD/TCCD, è il più metodo di screening comune utilizzato tra i rispondenti, probabilmente per la sua natura non invasiva e la facilità d'uso in terapia intensiva
- Non vi sono rischi di radiazioni e di contrasto
- Ha un livello accettabile di rilevamento di vasospasmo e un relativo risparmio sui costi
- Tuttavia, Angiografia rappresenta il gold standard definitivo per la diagnosi di vasospasmo cerebrale perché può dare informazioni temporali relative alla dinamica del flusso oltre a fornire prestazioni ottimali nella valutazione del calibro dei vasi sanguigni.

## Editorial



## Cocaine and Acute Basilar Artery Occlusion: What we Know to Date?



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## Nei consumatori di cocaina, il meccanismo principale dell'ictus ischemico è il vasospasmo delle arterie cerebrali che può essere correlato a diversi fattori

- Inibizione della ricaptazione della serotonina;
- Potenziamiento della vasocostrizione indotta dalla noradrenalina;
- Aumentanto flusso di calcio nella muscolatura liscia vascolare
- apoptosi nella muscolatura liscia vascolare cerebrale, che porta a ischemia e attivazione dei recettori dell'endotelina-1 (ET-1).
- dall'inibizione della via dell'ossido nitrico (NO)
- e/o dall'aumento del rilascio di ET-1

# Conclusioni

## Lo studio sonologico dei vasi extra ed intracerebrali nella vertigine centrale

- Potrebbe essere di aiuto nel ridurre rapidamente gli errori diagnostici di una vertigine centrale, in particolare condizioni cliniche come Ictus del circolo posteriore.
- Nell'Ictus ischemico, in particolare nel circolo posteriore, potrebbe ridurre i tempi diagnostici e terapeutici nel management non solo Ospedaliero ma pre-Ospedaliero
- In ambito pre-ospedaliero potrebbe migliorare l'accuratezza diagnostica (in termini di un'accurata selezione e identificazione dei pazienti con un'elevata probabilità di occlusione di vasi di grandi dimensioni), ridurre ritardi nel trasporto pre-ospedaliero e valutare meglio in quale centro stroke (Spoke o Hub) trasportare il paziente per un miglior trattamento del paziente con ictus ischemico e in particolare in quei pazienti con un coinvolgimento del circolo vertebro-basilare.

**Grazie per l'attenzione**