CRIMINI E MISDIAGNOSI SUL CIRCOLO VERTEBRO-BASILARE

CHAMALEONS

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ASST MELEGNANO MARTESANA
MILANO

Associazione Neurologia Emergenza Urgenza

Nothing to disclose

CRIMINI E MISDIAGNOSI SUL CIRCOLO VERTEBRO-BASILARE

STROKE MIMICS

FALSE POSITIVE - STROKE

CHAMALEONS

FALSE NEGATIVE - STROKE

MIMICS

FREQUENCY 15-25%	
TYPES	SEIZURES
	MIGRAINE
	SEPSIS
	METABOLIC DISORDERS
	FUNCTIONAL DISORDERS
	TUMOR

CHAMALEONS

FREQUENCY 2-26%	
TYPES	SEIZURES
	MIGRAINE/HEADACHE
	ACUTE CONFUSIONAL STATE
	DECREASED/LOSS OF CONSCIOUSNESS
	MOVEMENTS DISORDERS
	DIZZINESS – VERTIGO

CHAMELEONS

…….DO NOT APPEAR TO REPRESENT A STROKE ON INITIAL PRESENTATION

VARIABLES

- ONSET

  PROGRESSIVE AND STEPWISE

- SYMPTOMS

  “POSITIVE” SUCH AS MOVIMENT DISORDERS OR SEIZURES AND/OR NON FOCAL SYMPTOMS

- LACK OF VASCULAR TERRITORY

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Missed Ischemic Stroke Diagnosis in the Emergency Department by Emergency Medicine and Neurology Services

Allison E. Arch, MD, MPH; David C. Weisman, MD; Steven Coca, DO, MS; Karin V. Nystrom, APRN, MSN; Charles R. Wira III, MD; Joseph L. Schindler, MD

STROKE, 2016

STUDY PERIOD february 2013 - 2014			
	ACADEMIC TEACHING HOSPITAL	LARGE COMMUNITY HOSPITAL	TOTAL
CASES	280	185	465
MISSED STROKE	55/280 (20%)	48/185 (26%)	103/465 (22%)
MISSED STROKE PRESENTED WITHIN 6 HOUR	28/55 (51%)	17/41 	45/103 (44%)
NEUROLOGICAL EVALUATION	20/5 (36%)		

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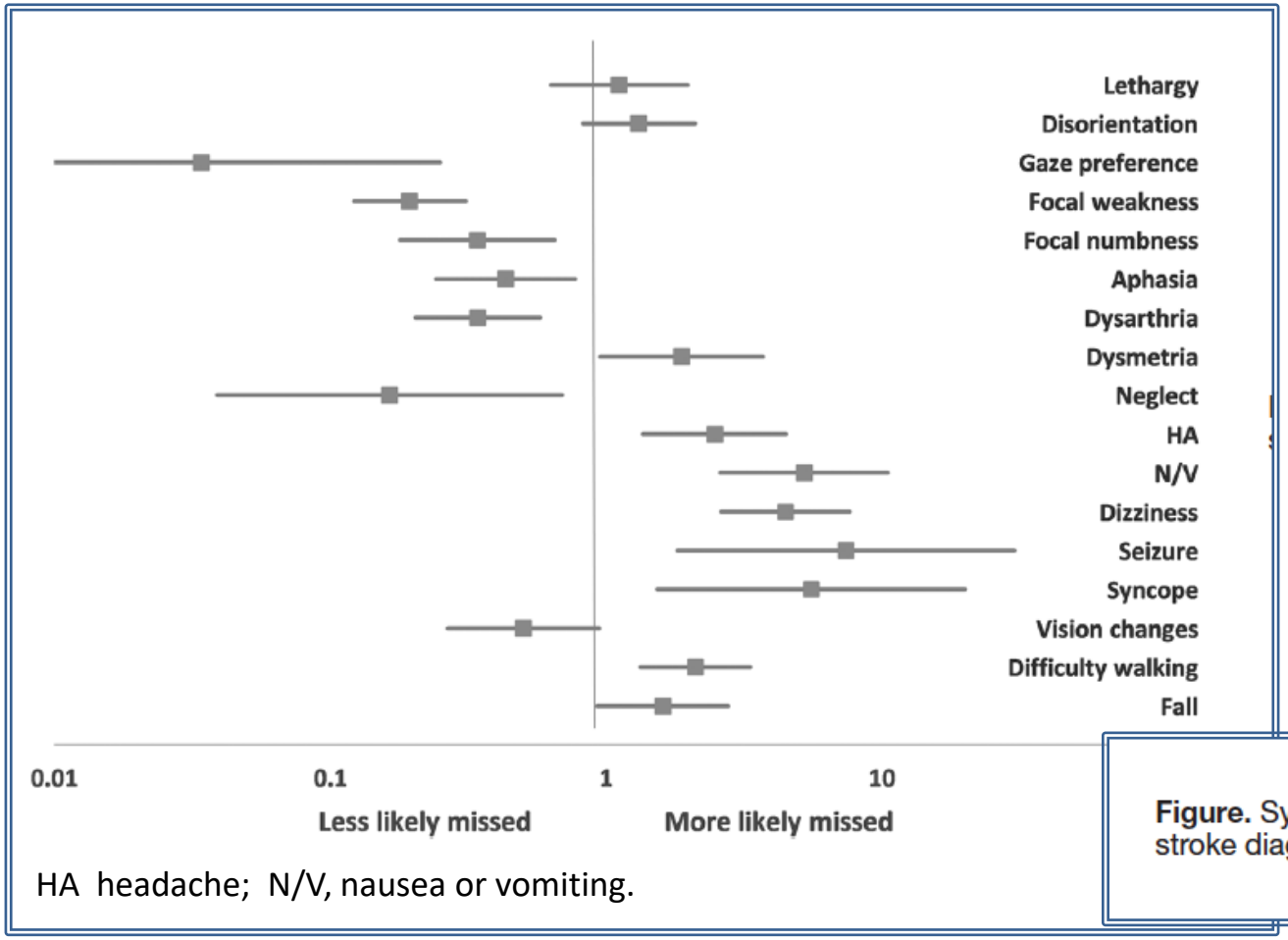

HA headache; N/V, nausea or vomiting.

Figure. Symptoms associated with missed stroke diagnosis.

CRIMINI E MISDIAGNOSI SUL CIRCOLO VERTEBRO-BASILARE

CHAMALEONS

Posterior Versus Anterior Circulation Infarction

How Different Are the Neurological Deficits?

Wen-Dan Tao, MD; Ming Liu, MD, PhD; Marc Fisher, MD; De-Ren Wang, MD; Jie Li, MD; Karen L Furie, MD, MPH; Zi-Long Hao, MD; Sen Lin, MD; Can-Fei Zhang; Quan-Tao Zeng; Bo Wu, MD, PhD

Background and Purpose—Distinguishing between symptoms of posterior circulation infarction (PCI) and anterior circulation infarction (ACI) can be challenging. This study evaluated the frequency of symptoms/signs in the 2 vascular territories to determine the diagnostic value of particular symptoms/signs for PCI.

Methods—Neurological deficits were reviewed and compared from 1174 consecutive patients with a diagnosis of PCI or ACI confirmed by magnetic resonance imaging in the Chengdu Stroke Registry. The diagnostic value of specific symptoms/signs for PCI was determined by measuring their sensitivity, specificity, positive predictive value (PPV), and the OR.

Results—Homolateral hemiplegia (PCI, 53.6% versus ACI, 74.9%; $P<0.001$), central facial/lingual palsy (PCI, 40.7% versus ACI, 62.2%; $P<0.001$), and hemisensory deficits (PCI, 36.4% versus ACI, 34.2%; $P=0.479$) were the 3 most common symptoms/signs in PCI and ACI. The signs with the highest predictive values favoring a diagnosis of PCI were Horner's syndrome (4.0% versus 0%; $P<0.001$; PPV=100.0%; OR=4.00), crossed sensory deficits (3.0% versus 0%; $P<0.001$; PPV=100.0%; OR=3.98), quadrantanopia (1.3% versus 0%; $P<0.001$; PPV=100.0%; OR=3.93), oculomotor nerve palsy (4.0% versus 0%; $P<0.001$; PPV=100.0%; OR=4.00), and crossed motor deficits (4.0% versus 0.1%; $P<0.001$; PPV=92.3%; OR=36.04); however, all had a very low sensitivity, ranging from 1.3% to 4.0%.

Conclusions—This study indicates that the symptoms/signs considered typical of PCI occur far less often than was expected. Inaccurate localization would occur commonly if clinicians relied on the clinical neurological deficits alone to differentiate PCI from ACI. Neuroimaging is vital to ensure accurate localization of cerebral infarction. (***Stroke*. 2012;43:2060-2065.**)

CHAMALEONS

Posterior Versus Anterior Circulation Infarction

How Different Are the Neurological Deficits?

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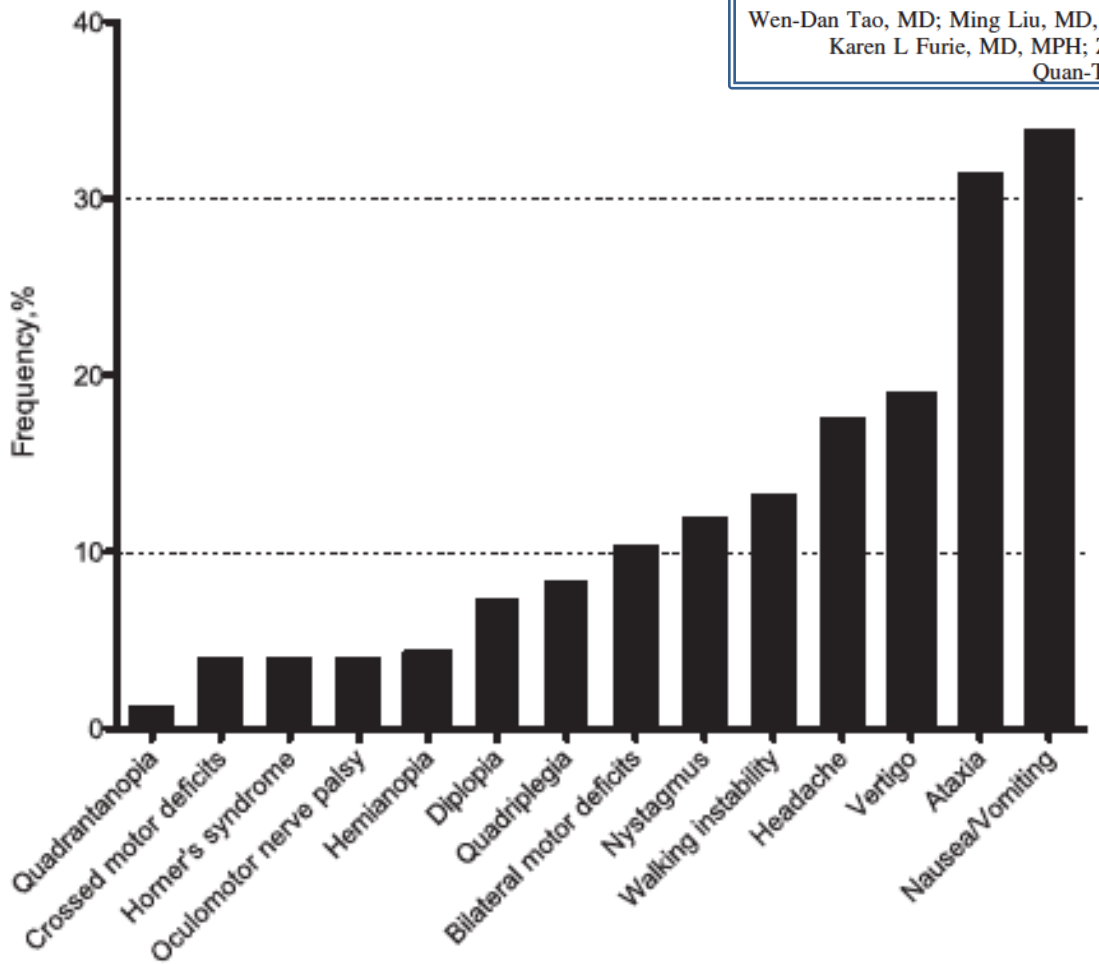

Figure 1. Neurological deficits significantly more common in posterior circulation infarction patients.

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Posterior Versus Anterior Circulation Infarction
How Different Are the Neurological Deficits?

Wen-Dan Tao, MD; Ming Liu, MD, PhD; Marc Fisher, MD; De-Ren Wang, MD; Jie Li, MD; Karen L Furie, MD, MPH; Zi-Long Hao, MD; Sen Lin, MD; Can-Fei Zhang; Quan-Tao Zeng; Bo Wu, MD, PhD

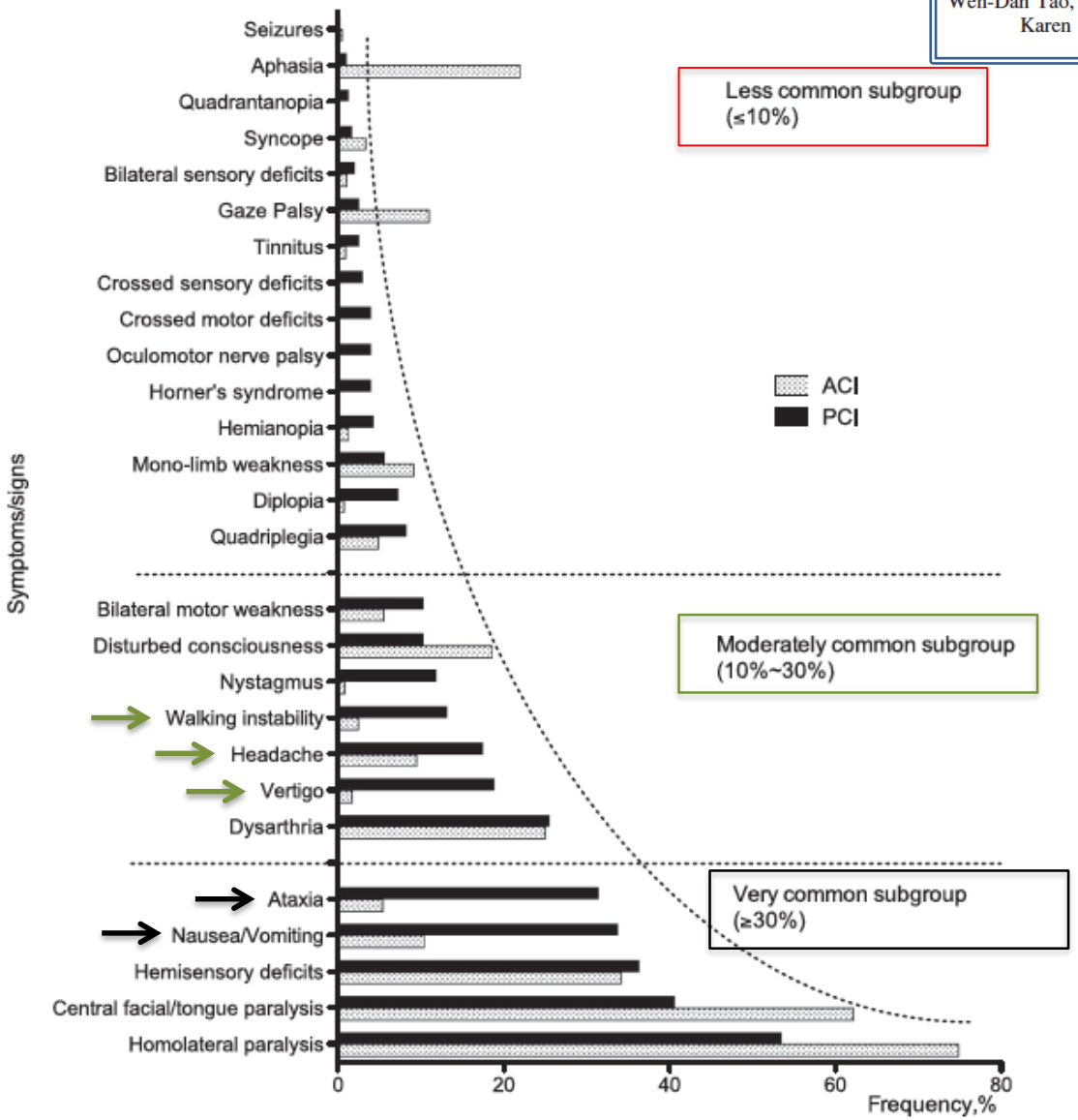

Figure 2. The frequency of single clinical symptom/sign in posterior circulation infarction and anterior circulation infarction.

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Did the role of the neurologist in the emergency department change during the COVID-19 pandemic? Evidence from an Italian nationwide survey

Giuseppe Micieli[1] · Anna Cavallini[2] · Pietro Cortelli[3,4] · Federico REA[5,6] on behalf of the Italian NEUday group

Table 2

Distribution of the reasons for neurological consultation

Reasons for the consultation	2019	2020	SMD
Focal neurological deficits	21.2%	22.8%	0.038
Transient loss of consciousness	12.8%	11.5%	0.041
Headache	12.5%	6.5%	0.205
Strength deficiency or sensory disturbances	11.5%	9.3%	0.072
Dizziness	9.1%	7.7%	0.052
Epileptic manifestation	8.6%	10.9%	0.078

Neurol Sci , 2022

CHAMALEO

NS Cerebrovascular Diseases

Original Paper

Cerebrovasc Dis 2017;44:83–87
DOI: 10.1159/000471929

Received: September 22, 2016
Accepted: March 22, 2017
Published online: May 17, 2017

Are We Overlooking Stroke Chameleons? A Retrospective Study on the Delayed Recognition of Stroke Patients

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- RETROSPECTIVE ANALYSIS
- 9-YEAR PERIOD
- 2.303 CASES

39.9% POSSIBLE STROKE CHAMALEONS

- 58.4% NEUROLOGICAL SYMPTOMS

Admission diagnosis	Cases, *n*	% of cerebrovascular events (*n* = 2,303)
Neurological manifestations	537	23.3
Disorders of somatic sensation	179	33
Altered consciousness/confusional stage	160	30
Disorders of speech/language	58	11
Disorders of motility	51	9
Disorders of CNS/special sense	44	8
Seizure disorders	42	8
Neuropsychiatric symptoms	3	1
Non-neurological manifestations	273	16.6
Cardiopulmonary	164	7.1
Systemic infections/general symptoms	116	5.0
Trauma	88	3.8
Gastrointestinal	8	0.4
Thromboembolic events elsewhere	6	0.3
Total	919	39.9

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Associazione Neurologia Emergenza Urgenza

CHAMALEO NS

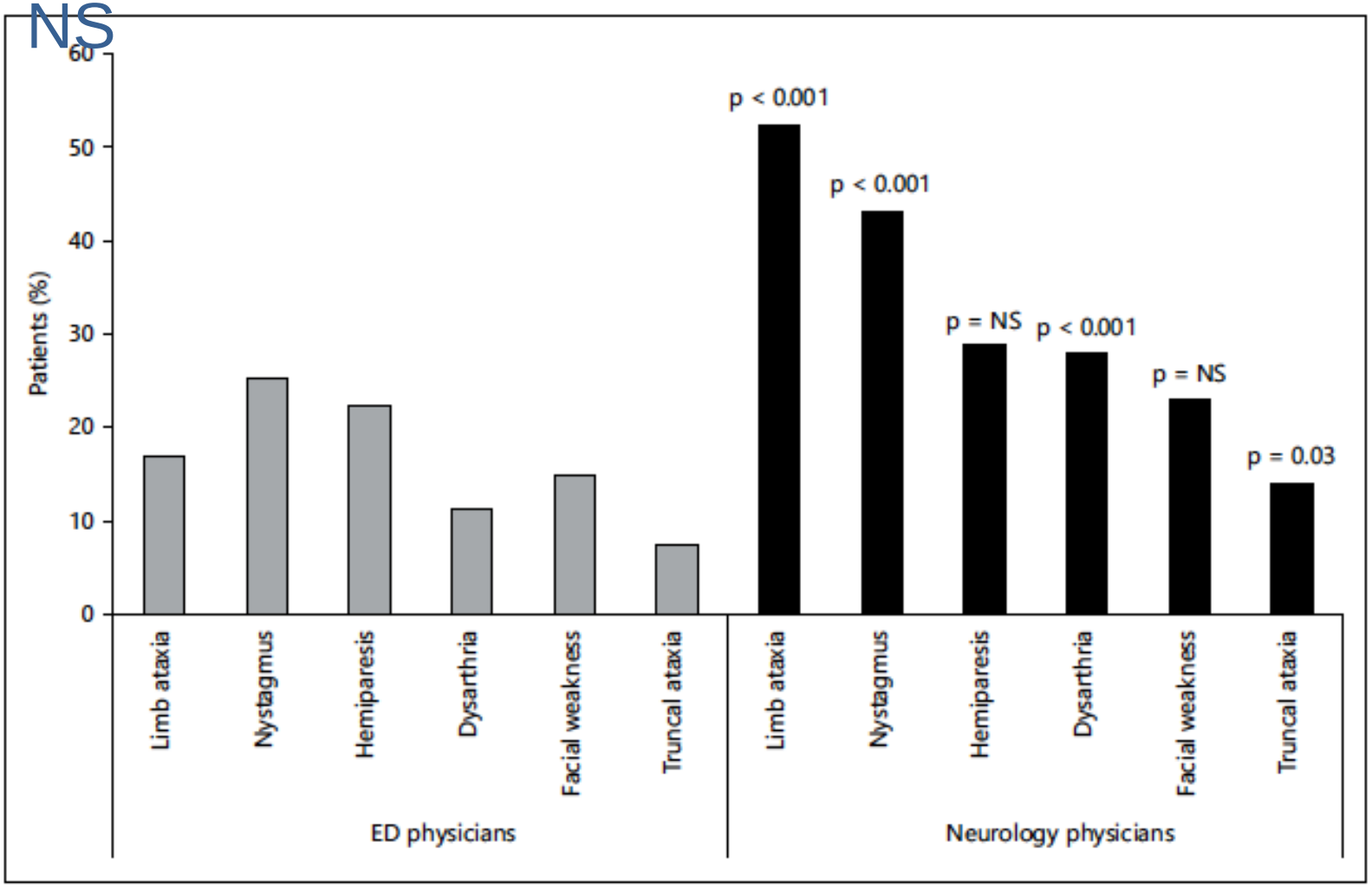


FIg. 1. Clinical signs elicited by the ED physicians and neurology physicians.

Cerbrovasc Dis , 2016

Stroke Chameleons

Callum M. Dupre, DO,* Richard Libman, MD,* Samuel I. Dupre, MS,†
Jeffrey M. Katz, MD,* Igor Rybinnik, MD,* and Thomas Kwiatkowski, MD‡

Journal of Stroke and Cerebrovascular Diseases, 2014

Table 1. *Positive predictive value of 5 proposed stroke chameleons*

Admitting diagnosis	Hypertensive emergency	Altered mental status	Syncope	Systemic infection	Suspected ACS
Count per diagnosis (n = 2528)	145	393	326	753	817
SE	2.1	1.2	1.1	.4	.4
Positive predictive value (95% CI)	7.7 (3.5-11.8)	6.9 (4.5-9.3)	4.4 (2.2-6.6)	1.1 (.3-1.8)	1.1 (.4-1.8)

Abbreviations: ACS, acute coronary syndrome; CI, confidence interval.

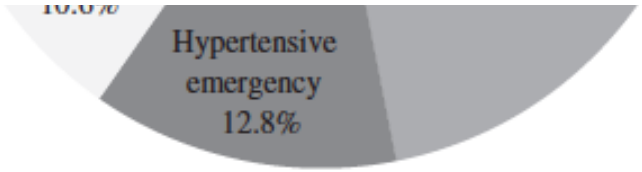


Figure 1. *Stroke chameleon presentation by primary diagnosis.*

CHAMALEONS

Original Paper

Neuro-epidemiology

Neuroepidemiology 2018;51:123–127
DOI: 10.1159/000491635

Received: April 8, 2018
Accepted: June 28, 2018
Published online: August 9, 2018

Factors Associated with Stroke Misdiagnosis in the Emergency Department: A Retrospective Case-Control Study

Abhay Venkat[a] Cecilia Cappelen-Smith[a–c] Shabeel Askar[a, b] Peter R. Thomas[a, b] Sonu Bhaskar[a–f] Amanda Tam[a] Alan J. McDougall[a–c] Suzanne J. Hodgkinson[a–c] Dennis J. Cordato[a–c]

Table 3. Comparative ED and outcome data between misdiagnosed patients and accurately diagnosed stroke controls

	Misdiagnosis (n = 156)	Control (n = 156)	p value
Premorbid nursing home residential accommodation, n (%)	27 (17)	13 (8)	0.02
Ambulance transport to hospital, n (%)	129 (83)	122 (78)	0.36
FAST-negative, n (%)	122 (78)	16 (10)	<0.0001
ED Triage Resuscitation/Emergency category, n (%)	51 (33)	91 (58)	<0.0001
Time to first ED physician contact, min, mean ± SD	91±82	61±70	0.001
Median time to CT (IQR), min	250 (309)	108 (161)	<0.0001
Admitted under neurology service, n (%)	101 (65)	139 (89)	<0.0001
Hospital length of stay, days, mean ± SD	12.7±9.1	10.7±9.1	0.06
Mortality at discharge, n (%)	12 (8)	16 (10)	0.43
Discharge modified Rankin Scale score ≥3, n (%)	85 (54)	88 (56)	0.73

ED, emergency department; FACE, face, arm, speech, time; IQR, interquartile range.

Acute stroke chameleons in a university hospital

Risk factors, circumstances, and outcomes

Benjamin Richoz, MD
Olivier Hugli, MD, MSc
Fabrice Dami, MD
Pierre-Nicolas Carron, MD
Mohamed Faouzi, PhD
Patrik Michel, MD

Neurology 2015

Table 4 Results for favorable outcome, mortality, and cerebrovascular event recurrences within the first 12 months

	Overall population	AIS-C	AIS	Unadjusted OR (95% CI)	p Value	Adjusted OR (95% CI)	p Value
No. of patients	2,200	47	2,153	—	—	—	—
Favorable outcome	1,296 (61.3)	23 (50.0)	1,273 (61.6)	0.62 (0.35-1.12)	0.12	0.21 (0.09-0.46)	<0.01
Mortality	416 (19.7)	14 (30.4)	402 (19.4)	1.81 (0.95-3.43)	0.07	4.37 (1.81-10.54)	<0.01
Recurrent ischemic cerebrovascular event	201 (10.0)	6 (13.3)	195 (9.9)	1.40 (0.59-3.35)	0.45	1.68 (0.68-4.12)	0.26

Abbreviation: AIS = acute ischemic stroke; AIS-C = acute ischemic stroke chameleon; CI = confidence interval; OR = odds ratio.
Results are given as numbers, as % of available data, and as OR.

Table 2 Independent associations comparing missed strokes with correctly diagnosed patients in the multivariate analysis (n = 2,137)

	OR (95% CI)	p Value
Age (for 1-y increase above 18 y)	0.98 (0.96-0.99)	<0.01
Pretreatment with hypolipidemic drugs	0.29 (0.09-0.97)	0.04
NIHSS score on admission (for 1-point increase)	0.99 (0.96-1.04)	0.99
Eye deviation	0.21 (0.05-0.94)	0.04
Diastolic blood pressure	0.98 (0.96-0.99)	0.04
Cerebellar stroke	3.78 (1.87-7.63)	<0.01

Abbreviations: CI = confidence interval; NIHSS = NIH Stroke Scale; OR = odds ratio.

MISDIAGNOSIS vs CORRECT DIAGNOSIS

- **Less favorable outcome**
- **Higher mortality**

RISK FACTORS for MISDIAGNOSIS

- **Younger Age**
- **Cerebellar stroke**

MD, 53 ANNI – MASCHIO

MARZO 2022 episodi di vertigine oggettiva, associati a nausea e vomito, talora instabilità posturale, durata variabile da pochi min. a diverse ore, risoluzione spontanea. Contestuale comparsa di episodi rialzi pressori: inizia terapia con OLmesartan

I^ accesso in PS Ospedale territoriale : visit ORL, consulenza cardiologica, ECO TSA , Ecocardio TT, Holter pressorio, RX rachide cervicale

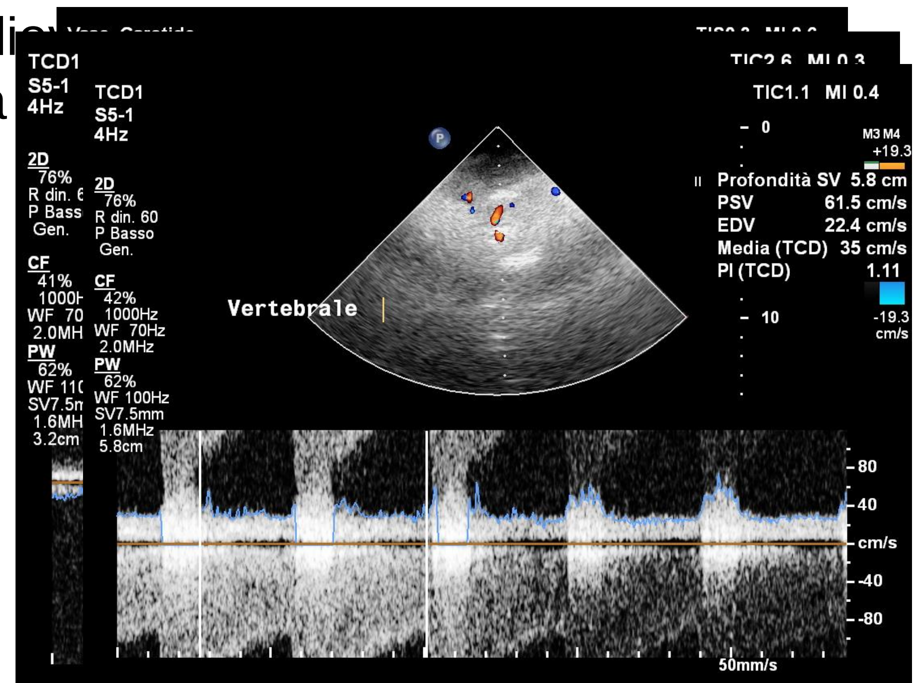
Riscontri negativi: lieve ateromasia carotidea, cervicouncoartrosi. Terapia sintomatica

LUGLIO 2022 II^ accesso in PS per episodio analogo ma persistente >24 ore.

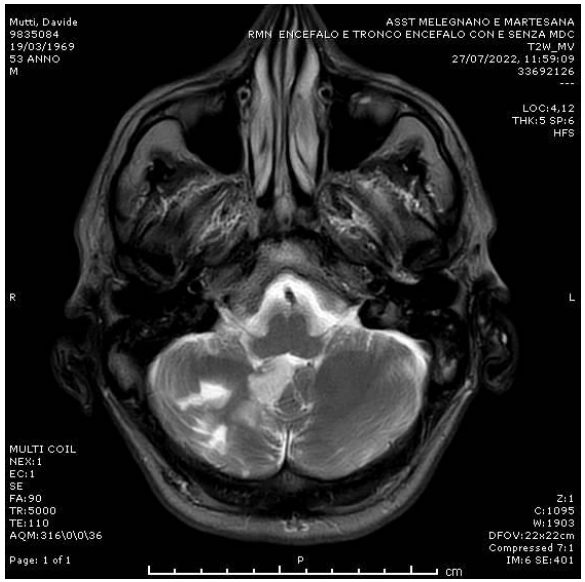
CONSULENZA NEUROLOGICA li

Holmes + a dx. Romberg sfumata

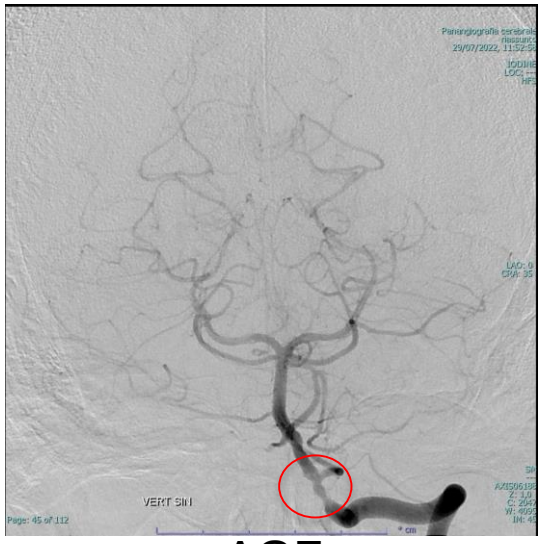
C



MRI-DWI

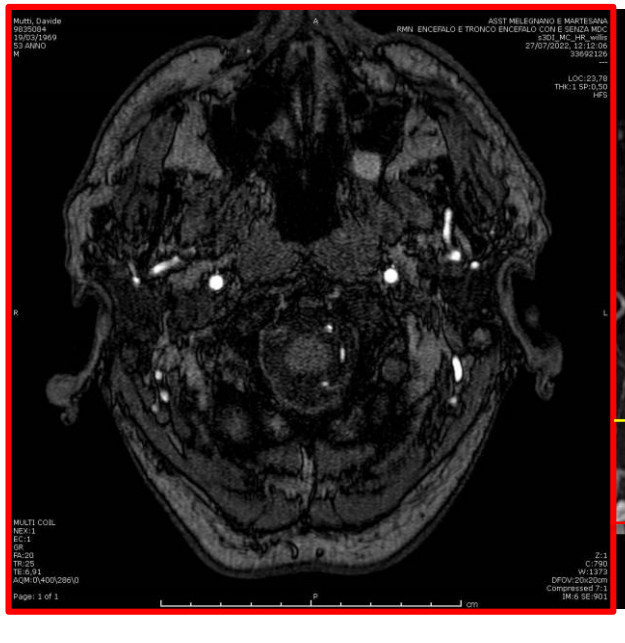


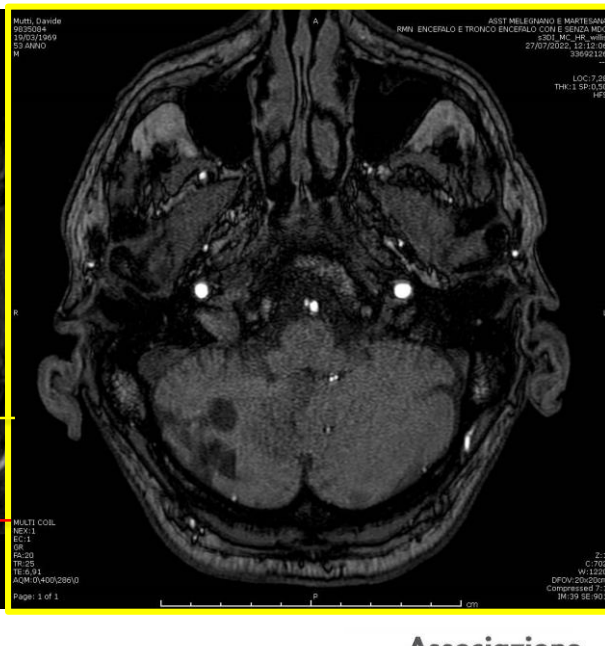
MRI-T2



AGF

Ospedale SS Paolo e Carlo





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CONCLUSION

CONSEQUENCES OF CHAMALEONS

- DELAYED ADMISSION
- LESS PROPERLY INVESTIGATED
- LOWER CHANCE TO RECEIVE IVT OR UNDERGO MECHANICAL TROMBECTOMY AND APPROPRIATE SECONDARY PREVENTION
- HIGHER RATES OF DISABILITY AND MORTALITY

CONCLUSION

DIAGNOSTIC ERROR IN STROKE

PATIENT FACTORS

- YOUNG AGE
- LOW RISK PROFILE
- WOMEN

CLINICAL FACTORS

- *PROGRESSIVE AND STEPWISE* ONSET
- *"POSITIVE" AND/OR NON FOCAL SYMPTOMS*
- LACK OF VASCULAR TERRITORY IDENTIFICATION

HOSPITAL FACTORS

- NEUROLOGIST AVAILABILITY
- USE OF DIGNOSTIC TOOL

STRATEGIES??

- Educating physicians about unusual presentations of stroke
- Keep in mind that stroke may occur simultaneously with other neurologic, psychiatric or medical conditions
- Lowering the threshold for neurologic consultation
- More systematic use of multimodal techniques in the ED (CT - MRI – VASCULAR ULTRASOUND)

Find out chamaleon!