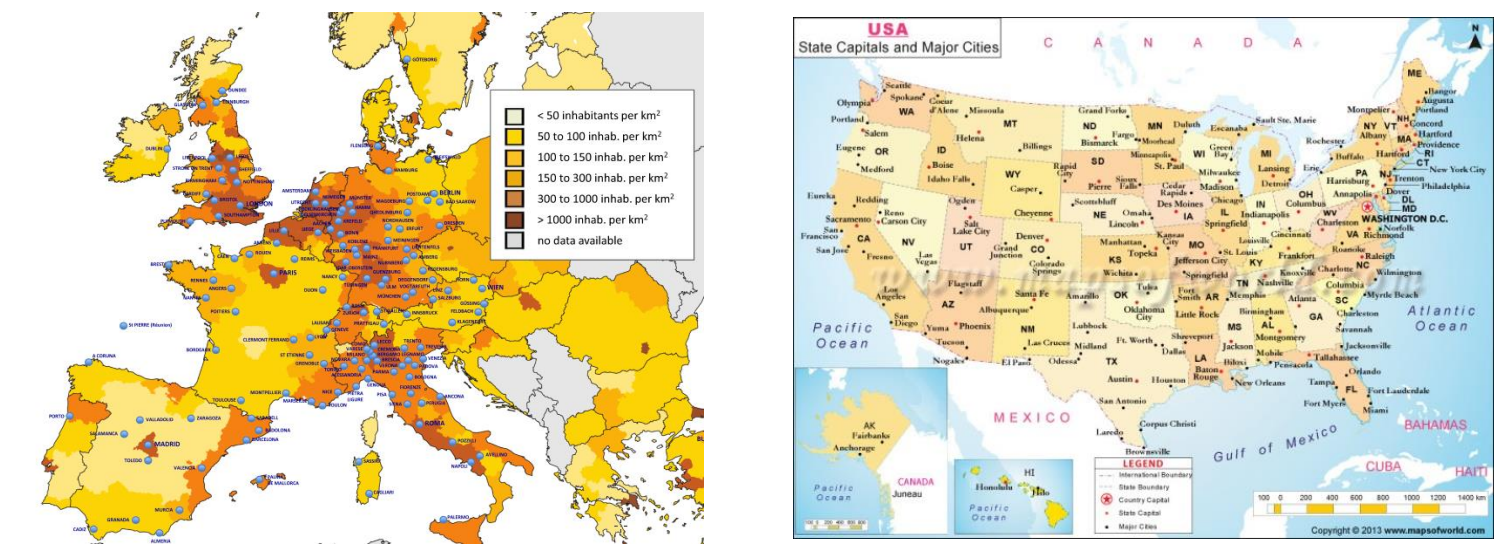


Management of vasospasm after aneurysmal subarachnoid hemorrhage: European and American survey results

Fàbregas N¹, Velly L², Bilotta F³, Soehle M⁴, Bruder N², Nathanson M⁵ on behalf of the ENIG Study Group

Anesthesiology Department of ¹Hospital Clínic. Barcelona University. Spain; ²University Hospital Timone. Marseille. France; ³Sapienza University Rome, Italy; ⁴University Hospital Bonn. Germany; ⁵University Hospital Queens Medical Centre. Nottingham. United Kingdom. (ENIG= European Neuroanaesthesia and critical care Interest Group)



Background & Goal of Study

Many aspects of aneurysmal subarachnoid hemorrhage (SAH) vasospasm therapy remain controversial. The European Neuroanaesthesia and critical care Interest Group (ENIG group) conducted a survey to determine the clinical practices of physicians treating SAH and to evaluate the discrepancy between practice and published evidence (1).

Materials & Methods

The research team generated a 31-item online questionnaire, which was distributed by the ENIG Group. Nine questions focused on vasospasm prevention, diagnosis and treatment. The survey remained online from early October to the end of November 2012 in Europe and from January 6th until February 7th 2014 through the SNACC web for its members.

Fisher's exact test was used for the analysis of responder subgroups.

Results & Discussion

Some respondents skipped answers and some questions have more than one possible response

	ENIG Survey (n=268)	SNACC Survey (n=77)	P value
Age (years) - n (%)			
<35	36 (13.4)	5 (6.6)	0.16
36-50	146 (54.4)	34 (44.7)	0.43
51-65	86 (32.1)	34 (44.7)	0.17
>65	0 (0.0)	4 (5.3)	<0.05
Primary Specialty - n (%)			
Mainly Neurological Critical Care	68 (25.4%)	2 (2.6)	<0.05
Mainly Neuroanesthesia	80 (29.9)	55 (72.4)	<0.05
Both	120 (44.8)	19 (25.0)	<0.05
Number of craniotomy per year - n (%)			
> 1000	21 (16.4)	26 (34.2)	<0.05
500-999	25 (33.6)	35 (46.1)	<0.05
< 500	33 (50.0)	15 (19.7)	0.21

	ENIG Survey (n=268)	SNACC Survey (n=77)	P value
Drug(s) used for vasospasm prevention - n (%)			
Nimodipine	259 (96.6)	70 (90.9)	0.85
Statins	55 (20.5)	15 (19.5)	1.00
Magnesium	52 (19.4)	14 (18.2)	1.00
Nicardipine if hypertension	13 (4.9)	19 (24.7)	<0.05
None of the above	8 (3.0)	0 (0.0)	0.20
Method(s) used for vasospasm diagnosis - n (%)			
Transcranial Doppler	210 (78.4)	59 (77.6)	1.00
CT angiography	111 (41.4)	36 (47.4)	0.55
Conventional angiography	99 (36.9)	22 (28.9)	0.43
CT perfusion	72 (26.9)	13 (17.1)	0.18
Brain tissue oxygen pressure	24 (9)	3 (3.9)	0.22
None of these methods	10 (3.7)	3 (3.9)	0.22

	ENIG Survey (n=268)	SNACC Survey (n=77)	P value
Interventional management of symptomatic cerebral vasospasm			
Interventional methods to treat symptomatic vasospasm- n(%)			
Angioplasty and intra-arterial vasodilator(s)	133 (49.6)	55 (72.4)	0.07
Intra-arterial vasodilator(s) alone	66 (24.6)	17 (22.4)	0.88
None of the above	58 (21.3)	5 (6.6)	<0.05
Angioplasty alone	12 (4.5)	9 (11.8)	0.06
Endovascular methods to treat symptomatic vasospasm- n(%)			
Nimodipine	163 (81.9)	22 (32.8)	<0.05
Milrinone	46 (23.1)	5 (7.5)	0.08
Papaverine	37 (18.6)	21 (31.3)	<0.05
Others	3 (1.5)	16 (23.9)	<0.05

	ENIG Survey (n=268)	SNACC Survey (n=77)	P value
Medical management of symptomatic vasospasm			
Medical methods used - n (%)			
"Triple-H" therapy	117 (43.7)	25 (33.3)	0.32
"Double-H" therapy	58 (21.6)	19 (25.3)	0.85
Only increase blood pressure	80 (29.9)	32 (42.7)	0.15
None of the above	13 (4.9)	2 (2.7)	0.74
Blood pressure target - n (%)			
MAP > 110 mmHg	71 (26.5)	29 (40.3)	0.10
MAP > 100 mmHg	79 (29.5)	20 (27.8)	0.88
MAP > 90 mmHg	83 (31.0)	16 (22.2)	0.32
MAP > 80 mmHg	15 (5.5)	1 (1.4)	0.21
No specific target	21 (7.5)	9 (12.5)	0.25
Main method to increase blood pressure - n (%)			
Noradrenaline (Norepinephrine)	241 (89.9)	39 (54.2)	<0.05
Phenylephrine	9 (3.4)	39 (54.1)	<0.05
Dopamine	13 (4.9)	7 (9.7)	0.16
Others	5 (1.9)	3 (4.2)	0.37
Additional fluid volume above standard fluid replacement - n (%)			
No hypervolemia	63 (23.5)	37 (53.6)	<0.05
1 litter/day	35 (13.1)	5 (7.3)	0.30
1-2 litter/day	74 (27.6)	15 (21.7)	0.54
2-3 litter/day	76 (28.4)	7 (10.1)	<0.05
3-4 litter/day	19 (7.1)	5 (7.3)	1.00
> 4 litter/day	1 (0.4)	0 (0.0)	1.00
Management of cardiac output - n (%)			
No intervention	208 (77.6)	57 (80.3)	0.92
Dobutamine	47 (17.5)	10 (13.2)	0.72
Milrinone	9 (3.4)	3 (3.9)	0.72
Epinephrine	4 (1.5)	1 (1.3)	1.00

"Triple-H therapy"= Hypervolemia, Hypertension and Hemodilution; "Double-H therapy"= Hypervolemia and Hypertension; MAP = mean arterial pressure

Conclusion

This study found striking variability in practice patterns of European and United States physicians involved in SAH.

Significant differences were noted between countries, and between high and low-volume coiling centers.

The lack of clear evidence on several clinical practices (for example, the blood pressure target) would justify prospective trials.

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