Neurosonologie et HSA anévrysmale

Vasospasme après une hémorragie sous-arachnoïdienne

Prévalence et délai d'apparition du vasospasme

- Présent à l'artério chez 21 à 70% des patients
- Apparaît entre J2 et J17
- Sévérité maximale entre J7 et J12
- Durée: 3 à 4 semaines

Diagnostic du vasospasme après une HSA

- L’artériographie
- DTC
- Echo DTC
- IRM
- Angioscanner

Diagnostic du vasospasme par artériographie

- Vasospasme modérée: réduction de la lumière artérielle < 25 %
- Vasospasme de sévérité moyenne: réduction la lumière artérielle 25 à 50 %
- Vasospasme sévère: réduction de la lumière artérielle > 50 %

L’artériographie: gold standard mais…

- Invasive
- Risque de complications rénales
- Risque d’ischémie cérébrale aiguë

Doppler et Echo-Doppler transcrânien

- Accélération des vitesses
- Seuils diagnostiques par artère

Définition des seuils de vitesses DTC

- Sensibilité et spécificité par artère
- Définition en termes de probabilité
- Définition en termes de sévérité

Study	*N*	Prevalence of Disease (%)	Positive Test (Mean Flow Velocity in cm/sec)	Sensitivity (%)	Specificity (%)	Predictive Value Positive (%)	Predictive Value Negative (%)
Middle cerebral artery (MCA)							
Grolimund et al.[83]	93 patients	20	120	78	85	57	80
Compton et al.[75]	20 patients	30	100	68	96	87	87
Lindegaard et al.[64]	51 patients	31[a]	110	85	98	95	94[b]
	112 MCAs		100	94[c]	90	81	97[b]
Sekhar et al.[74]	21 patients	38[d]	155	75	100	85	85
Lennihan et al.[82]	41 patients	10.6	120	86	86	42[b]	98[b]
	66 MCAs		140	86	98	83[b]	98[b]
Sloan et al.[55]	34 patients	85[e]	120	59	100	100	30
	52 MCAs	46[e]	120	84	89	87	90
Burch et al.[56]	87 MCAs	44	120	39	94	83	66
		44[f]	120	80	94	91[b]	87[b]
Anterior cerebral artery (ACA)							
Grolimund et al.[83]	93 patients	15	50% increase in flow velocity	71	100	100	95
Lennihan et al.[82]	66 ACAs[g]	22.7	120	13	96	49[b]	79[b]
Wozniak et al.[68]			140	13	100	100	80[b]
	87 ACAs	68	120	18	65	52	27
	73 ACAs[h]	66	120	15	96	88	37
Intracranial internal carotid artery (IICA)							
Burch et al.[56]	90 IICAs	49	90	25	91	76	58
Vertebral artery (VA)							
Sloan et al.[67]	64 VAs	25	60	44	88	54	82
Basilar artery (BA)							
Sloan et al.[67]	42 BAs	31	60	77	79	62	89
Posterior cerebral artery (PCA)							
Wozniak et al.[68]	84 PCAs	32	90	48	69	42	74
	77 PCAs[h]	30	90	48	78	48	78

[a]Vasospasm defined as MCA diameter less than or equal to 2.1 mm.

[b]Calculated values.

[c]Reported values.

[d]Vasospasm diagnosed on basis of clinical deficits and appropriate reduction in cerebral blood flow.

[e]Vasospasm defined by criteria adapted from Fisher et al.[6,7]

[f]Calculations based on the assumption that angiographic vasospasm was present on the day of the highest observed flow velocity.

[g]Calculations based on exclusion of nine false-positives for occlusion (see text for definition).

[h]Calculations based on exclusion of false-positives for occlusion and true-positives for occlusion.

Définition des seuils de vitesses DTC

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- Définition en termes de sévérité

Vessel	Number of Vessels	Possible Vasospasm[a]	Probable Vasospasm[a]	Presumed Definite Vasospasm[a]
Intracranial internal carotid artery[56]	90	80 (89)	110 (98)	130 (100)
Middle cerebral artery[56]	87	100 (88)	110 (94)	130 (96)
Anterior cerebral artery[68]	87	110 (92)[b]	120 (96)[b]	130 (100)[b]
	73			
Vertebral artery[67]	64	55 (78)	60 (86)	80 (100)
Basilar artery[67]	42	60 (79)	80 (93)	95 (100)
Posterior cerebral artery[68]	84	80 (69)[b]	90 (78)[b]	110 (93)[b]
	77			

Définition des seuils de vitesses DTC

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Définition en termes de sévérité

- ACM: Vm < 120cm/sec: VSP modéré
- ACM: Vm: 120-200cm/sec: VSP de sévérité moyenne
- ACM: Vm > 200cm/sec: VSP sévère

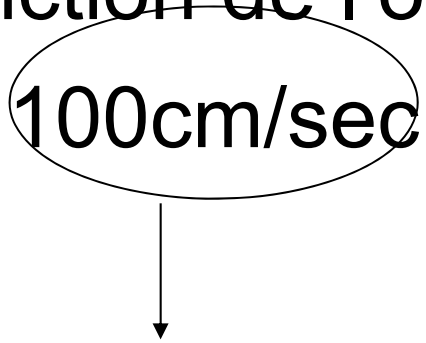
Déterminants du débit sanguin cérébral

- Le degré du spasme artériel
- L'autorégulation de la circulation cérébrale: à un degré égal de rétrécissement artériel, le débit sanguin est: normal, ou diminué selon le niveau de l'autorégulation

Attention!

Constriction de l'origine de l'ACM de 80%

→ V: 100cm/sec; DSC: proche de 0



en apparence normale

Ne *pas* faire le DTC uniquement au moment de la dégradation clinique

Les seuils de vitesses après 55 ans

- Soustraire 30cm/sec pour Vm:

  - ACM = 110 cm/sec au lieu de 140; Sp: 94%
  - ACA = 110 cm/sec au lieu de 140; Sp: 89%
  - ACI = 80cm/sec au lieu de 110; Sp: 92%
  - ACP = 80cm/sec au lieu de 110; Sp: 81%

Les seuils de vitesses après 55 ans

- Soustraire 15cm/sec pour Vm:

  - AV: 55 cm/sec au lieu de 70; Sp: 81%

  - TB: 55 cm/sec au lieu de 70; Sp: 60%

Utilisation de l'écho-doppler trans-crânien

→ diagnostic de 80% des VSP modérés de l'ACM

→ diagnostic de 92% des VSP très serrés de l'ACM

Suivi du vasospasme

Une estimation sévérité:

La cinétique de l'augmentation des vitesses de plus de 50cm/sec ou 25% en 24h indique un vasospasme sévère

Limites de l'écho-doppler trans-crânien

→ Difficultés d'accès liés à la fenêtre acoustique

→ Moins performant pour les artères autres que l'artère cérébrale moyenne

→ Absolue nécessité de répéter l'examen

Pour faire quoi?

neurocritical care society Neurocrit Care (2011) 15:211–240
DOI 10.1007/s12028-011-9605-9

REVIEW

Critical Care Management of Patients Following Aneurysmal Subarachnoid Hemorrhage: Recommendations from the Neurocritical Care Society's Multidisciplinary Consensus Conference

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Published online: 20 July 2011

Abstract Subarachnoid hemorrhage (SAH) is an acute cerebrovascular event which can have devastating effects on the central nervous system as well as a profound impact on several other organs. SAH patients are routinely admitted to an intensive care unit and are cared for by a multidisciplinary team. A lack of high quality data has led to numerous approaches to management and limited guidance on choosing among them. Existing guidelines emphasize risk factors, prevention, natural history, and prevention of rebleeding, but provide limited discussion of the complex critical care issues involved in the care of SAH patients. The Neurocritical Care Society organized an international, multidisciplinary consensus conference on the critical care management of SAH to address this need. Experts from neurocritical care, neurosurgery, neurology, interventional neuroradiology, and

Keywords Subarachnoid hemorrhage · Critical care · Aneurysm · Vasospasm · Anticonvulsants · Hyponatremia · Endovascular · Fever

Introduction

Subarachnoid hemorrhage (SAH) is an acute cerebrovascular event which can have devastating effects on the central nervous system as well as a profound impact on several other organs. The course of the disease can be prolonged, with considerable secondary brain injury due to delayed cerebral ischemia (DCI). Systemic manifestations affecting cardiovascular, pulmonary, and renal function are common, and complicate the management of DCI.

Due to the profound effects of the hemorrhage itself and the risk of early rebleeding and hydrocephalus, SAH patients are routinely admitted to an intensive care unit and are cared for by a multidisciplinary team including neurosurgeons,(neuro) intensivists, (neuro) anesthesiologists and interventional neuroradiologists. The ICU course of SAH patients ranges from a few days to a few weeks and is frequently accompanied by multiple medical complications.

SAH management. They emphasize risk factors, prevention, natural history, and prevention of rebleeding, but provide limited discussion of the critical care issues involved in the care of SAH patients. In order to provide a comprehensive review of those issues the Neurocritical Care Society organized a multidisciplinary consensus conference on the critical care management of SAH. Topics were chosen based on their relevance to the critical care management of patients with aneurysmal SAH. Procedures used to repair aneurysms were not addressed.

Statement of Purpose

The purpose of the consensus conference was to develop recommendations for the critical care management of patients following acute SAH. The complex multi-organ pathophysiology of SAH presents a multitude of clinical challenges which demand attention. For each situation decisions must be made about if, when, and how to intervene. Ideally, each decision would be made based on high quality data; yet the reality is that such data rarely exist. Still, decisions about management must be made. Recommendations were developed based on the literature, a robust discussion regarding the interpretation of the liter-