

Medical and Neurological Complications of the current management strategy of Angiographically negative non-traumatic subarachnoid hemorrhage patients

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BACKGROUND

Spontaneous subarachnoid hemorrhage is a potentially devastating medical condition with high morbidity and mortality. In approximately 5-10% of cases, no underlying vascular etiology is found¹ as the source of hemorrhage upon diagnostic evaluation with a first cerebral angiography, the gold standard. This small subset of patients proceed to a frequently benign hospital course prior to discharge home after careful monitoring and further vascular imaging (MRI/CTA/repeat angiography). Common strategy at many hospitals include: mandatory ICU level stay for up to 14 days with strict bedrest, constant neurological serial examination, invasive arterial and central line monitoring, and aneurysm rupture precautions. Some patients require intubation and ventilator support, while they are being monitored for neurological complications including seizures, vasospasm and hydrocephalus². The mandatory bedrest and invasive monitoring places the patient at risk for other medical complications including deep venous thrombosis, pulmonary embolus, pneumonia, urinary tract infection, line infection/sepsis, peptic ulcer, arterial line occlusion and vessel injury with extremity compromise, rhabdomyolysis, and muscle wasting³. We evaluated the frequency of complications in this patient population.

METHODS

This was an IRB approved, retrospective MR review from July 2008 to 2011. Patients (aged 18-100) with ICD-9 code for non-traumatic subarachnoid hemorrhage that had angiograms and cranial CT's were evaluated as the first screening measure. Negative screening angiograms constituted our study population. We collected WFNS admission grade, incidence of mortality, length of hospital stay, length of bed rest, and incidence of pneumonia, central line infection, urinary tract infection, arterial thrombosis and use of anti-epileptic drugs.

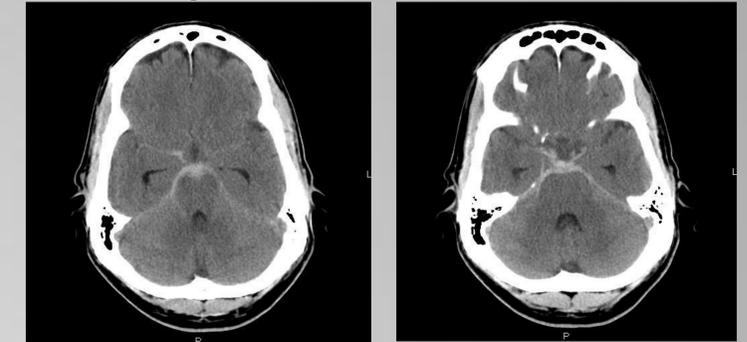
RESULTS

Fifty-eight patients met the study criteria and utilized 857 ICU days. There was no mortality. All patients were discharged after a mean of 14.8 days and stayed at bed rest for 10.5 days. The mean age of the patients was 59.3 (SD=11.9, range 31-86). Seven of the 13 intubated patients and 1 non-intubated patient developed pneumonia. Pneumonia was associated significantly with intubated patients (p<0.0001). Bed rest days were significantly higher in patients that developed pneumonia (17.8 vs. 9.3 days; P=0.002)(Table 1). Patient's World Federation of Neurological Surgeons (WFNS) admission grade had a significant effect on bed rest days (13 vs. 18.8 days, grade 1 vs. grade 2+ respectively; P=0.0016). No significant additional risk was associated with arterial thrombosis, central line infection, urinary tract infection, or use of anti-epileptic drugs.

Table 1. Hospital Stay and Complications

Characteristic	Presence	N	Mean ± SD	p-value
Intubation Days				
Pneumonia	No	50	9.3 ± 7.1	0.002
	Yes	8	17.8	
Total Central Line Days				
Central Line Infection	No	17	12.4 ± 6	N/A
	Yes	1	15.8 ± 9.5	
Total Foley Days				
Urinary Tract Infection	No	27	12 ± 7.8	0.2183
	Yes	10	15.8 ± 9.5	
Occurrence of Seizures				
AED's	No	4	0	NA
	Yes	53	1*	
Length of Stay				
WFNS Score	1	37	13 ± 5.8	0.0016
	2+**	20	18.8 ± 7	
CT	cisternal/sylvian	11	20.00 ± 8.57	cisternal/sylvian vs. cisternal, p=0.0047; cisternal/sylvian vs. diffuse, p=0.394 cisternal/sylvian vs. N/A, p=0.0029
	Cisternal	35	13.69 ± 5.16	
	Diffuse	7	17.43 ± 8.04	
	N/A	5	9.60 ± 3.21	
Vasospasm				
CT	cisternal/sylvian	9	-	0.1820
	Cisternal	33	-	
	Diffuse	5	-	
	N/A	5	-	

Figure 1: Angiogram-negative subarachnoid hemorrhage



Angiogram-negative subarachnoid hemorrhage classically displays the pattern of blood demonstrated in the images above.

CONCLUSION

Our findings indicate that our present monitoring protocol may be associated with some complications that could be prevented with earlier mobilization; therefore a more flexible surveillance should be assigned to this group of subarachnoid hemorrhage patients. Techniques such as earlier mobilization, reduced invasive monitoring, and employment of less stringent management guidelines⁴ may be more in accordance with the benign course of this complex subgroup of patients.

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