

**Presence of Obstructive Sleep Apnea Worsens the Prognosis of Intracranial Aneurysms** Shyamal C Bir MD PhD; Alireza Minagar MD; Anil Nanda MD FACS; Oleg Chernyshev; Hai Sun MD PhD



## Introduction

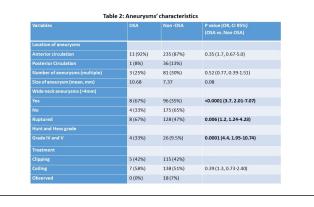
Obstructive sleep apnea (OSA) is associated with progression abdominal aortic aneurysms. However, role of OSA in progression and outcome of treatment in intracranial aneurysm is unknown. We have investigated the role of OSA in progression and outcome of treatment in intracranial aneurysm

## Methods

Patient and aneurysm characteristics and treatment outcomes of patients treated from 2010 through 2015 were analyzed. Association of OSA and outcome of treatment were determined by regression analysis

Variables			P value (OR, Cl 95%)
Total Cases	12 (4%)	271 (96%)	
Age			
Median	59	58	0.75
Range	42-72	17-84	
Gender			
Male	4 (33%)	69 (25.5%)	0.35 (1.3, 0.72-2.71)
Female	8 (67%)	202 (74.5%)	
Ethnicity			
Caucasians	6 (50%)	164 (60.5%)	0.25 (0.66, 0.37-1.21)
African Americans	6 (50%)	107(39.5%)	
Comorbidities			
	10 (83.3%)	191 (70.5%)	0.04 (2, 1.02-2.39)
Smoking	6 (50%)	134 (49%)	0.9 (1, 0.57-1.88)
Obesity	8 (67%)	99 (33%)	<0.0001 (4.1, 2.2 7.76)
Hyperlipidemia	4 (33%)	40(14%)	0.002 (3, 1.43-6.60)
Drug abuse	4 (33%)	27 (10%)	0.0001 (4.4, 1.95-10.74)
	5 (41%)	33 (12%)	<0.0001 (5, 2.37-11.49)
	4 (33%)	55 (20%)	0.03 (1.9, 1.1-3.97)
DM	3 (25%)	34 (12.5%)	0.04 (2.2, 1.01-5.06)
COPD	3 (25%)	23 (9.7%)	0.008 (2.9, 1.28-7.42)

Variables			P value (OR, CI 95%) (OSA vs. Non-OSA)
Total Cases	12 (4%)	271 (96%)	
Age			
Median	59	58	0.75
Range	42-72	17-84	
Gender			
Male	4 (33%)	69 (25.5%)	0.35 (1.3, 0.72-2.71)
Female	8 (67%)	202 (74.5%)	
Ethnicity			
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Drug abuse	4 (33%)	27 (10%)	0.0001 (4.4, 1.95-10.74
	5 (41%)	33 (12%)	<0.0001 (5, 2.37-11.49)
CVA	4 (33%)	55 (20%)	0.03 (1.9, 1.1-3.97)
DM	3 (25%)	34 (12.5%)	0.04 (2.2, 1.01-5.06)
COPD	3 (25%)	23 (9.7%)	0.008 (2.9, 1.28-7.42)



## Results

Among total 283 patients, 12 (4%) patients had OSA. One hundred and twenty patients (42.4%) underwent surgical clipping, 145 patients (51.2%) were undergone endovascular coiling and 18 (6.4%) were observed. Angiographically, patients with OSA (22%) had comparatively higher number of residual aneurysms than patient without OSA (14%). Vasospasm after initial treatment was significantly higher in OSA (25%) group compared to without OSA (8%) group (p=0.004). The mean MRS score was 2 and 1.4 in OSA and without OSA groups, respectively. On regression analysis, patients without OSA (p=0.03), non-smoker (p=0.02) and coiling (p=0.02) were identified as predictors of better outcome. African Americans (0.005), with OSA (p=0.049) and ruptured aneurysms (p<0.001) had significantly higher number of vasospasms.

## Conclusions

Additional care including treatment of vasospasm and re-treatment of residual aneurysms should be taken in the intracranial aneurysm patients associated with OSA. Simultaneous treatment of OSA may be beneficial for these patients.

Table 3: Follow-up results						
Variables	OSA	Non -OSA	P value (OR, Cl 95%) (OSA vs. Non OSA)			
Follow-up time (mean, months)	29 (6-66)	31 (6-131)				
MRS Scale (median)	2	1.4	0.01			
Good (MRS 0-2)	9 (75%)	234 (86%)				
Poor (MRS 3-6)	3 (25%)	37 (14%)	0.07 (2, 0.94-4.57)			
Radiological outcome						
Complete occlusion	9 (75%)	234 (86%)				
Residual	3 (25%)	37 (14%)	0.07 (2, 0.94-4.57)			
Vasospasm						
Yes	3 (25%)	23 (8%)	0.005 (3.4, 1.37-9.26)			
VP shunt	0 (0%)	23 (8.5%)				
LOS (mean)	9.7 (1-30)	7.8 (1-43)	0.40			

Univariate analysis				
ables	OR (95% CI)	P value		
dictor for poor outcome				
ider (Male)	1.0 (0.48-2.27)	0.90		
l (yes)	2.5 (1.04-6.40)	0.04		
(yes)	2.2 (0.96-5.16)	0.06		
) (yes)	2.6 (1.13-5.79)	0.02		
(yes)	1.9 (0.91-4.10)	0.08		
oking (yes)	2.7 (1.33-5.61)	0.006		
(yes)	1.9 (1.04-3.90)	0.03		
ing (yes)	2.5 (1.12-5.75)	0.02		
dictor for poor vasospasm				
can Americans	3.1(1.35-7.37)	0.005		
tured aneurysm	15.5 (3.59-67.13)	<0.001		
	3.5 (1.01-14.21)	0.049		