

Hounsfield Unit Value and Clot Length in the Acutely Occlude Vessel and Time Required to Achieve Thrombectomy, Complications and Outcome

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Introduction

Intra-arterial therapy for ischemic stroke now has an established role. We investigated if Hounsfield Units quantification on noncontrast CT is associated with ease and efficacy of mechanical thrombectomy and outcomes.

Methods

We retrospectively studied a prospectively maintained database of cases of acute ischemic stroke that underwent intra-arterial therapy between May 2008 and August 2012. Functional outcome was assessed by ninety-day follow up mRS. Patients were dichotomized base on time to recanalization. Hounsfield units were calculated on head CT. Thrombus location and length were determined on CT angiography. Simple linear regression was used to analyze the association between clot length, average HU, and other clinical variables.

Results

141 patients were included. There was no difference in clot length or average HU among patients with good recanalization achieved within an hour compared to those in which procedures extended beyond an hour. There was no relationship between clot length or density and recanalization. The thrombus length and density were not significantly different between patients with procedural complications and those without. The presence of post procedure intracranial hemorrhage was not associated with thrombus length or density. Ninety day mRS was not associated with thrombus length or density.

	N (122)	length (mm)	p Valu
Recanalization time, min	118		0.36
0-60	47	14.1 (10.9)	
>60	71	12.4 (8.4)	
Trestment	122		
IV tPA	14	15.4 (17.0)	
LA 1PA	61	14.1 (8.8)	
IV + LA IPA	34	12.1 (6.7)	
No IV or IA 1PA	13	10.8 (7.7)	
mRS at 90 days	112		
0	14	12.2 (6.6)	
1	26	11.8 (7.1)	
2	13	15.2 (9.8)	
3	14	13.5 (7.6)	
4	13	11.7 (9.0)	
5	5	15.8 (10.1)	
6	27	16.3 (13.7)	
mPS at 90 days categorized as good outcome	112		0.30
mRS 0-2	53	12.8 (7.7)	
mRS>2	59	14.6 (11.2)	
mPS at 90 days categorized as bad outcome	112		0.15
mRS 5-6	32	16.3 (13.1)	
mRS<5	80	12.7 (7.8)	
Past TIQ flow	122		
0	7	16.4 (9.8)	
1	4	16.3 (8.8)	
2A	16	11.5 (6.1)	
2B	50	14.0 (11.9)	
3	45	12.4 (7.3)	
Post TIQ flow categorized as good flow	122		0.92
0-2A	27	13.5 (7.6)	
2B-3	95	13.3 (10.0)	
Clinically significant event	119		0.13
Yes	4	6.3 (3.6)	
No	115	13.5 (9.5)	
Procedural complications	122		0.11
Yes	10	8.7 (6.6)	
No	112	13.7 (9.6)	
Henorhage	122		0.66
Yes	19	14.2 (7.6)	
No	103	13.2 (9.8)	
Hyperdense MCA	122		0.009
Yes	75	15.2 (7.9)	
No	47	10.3 (10.9)	

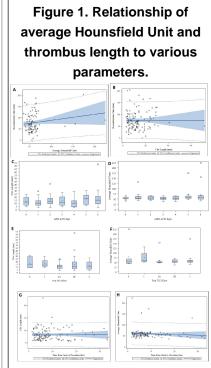
Table 1.

Average clot

Association of various patient parameters including procedural and postprocedural events and thrombus length (mm). Data is expressed as mean (SD).

Table 2.				
	N (95)	Average HU	p Value	
Recanalization time, min	91		0.08	
0-60	38	55.3 (7.5)		
>60	53	63.7 (33.4)		
Treatment	94			
IV IPA	10	73.8 (53.2)		
IA tPA	54	60.6 (24.5)		
IV + IA IPA	22	54.4 (9.2)		
No IA or IV LPA	ð	52.9 (5.6)		
mRS at 90 days	90			
0	12	54.8 (5.9)		
1	18	60.9 (19.4)		
2	11	55.3 (8.4)		
3	13	53.2 (8.0)		
4	11	55.1 (9.5)		
5	8	71.4 (42.1)		
8	17	70.5 (47.3)		
mRS at 90 days categorized as good outcome	90			
mRS 0-2	41	57.6 (14.0)	0.34	
mRS>2	49	62.6 (33.3)		
mRS at 90 days categorized as bad outcome	90		0.12	
mRS 5-6	25	70.8 (44.8)		
mRS<5	65	56.3 (12.3)		
Post TICI flow	95			
0	7	79.1 (64.6)		
1	4	75.4 (37.7)		
2A	12	60.3 (30.2)		
2 B	40	55.9 (8.5)		
3	32	58.6 (22.6)		
Post TICI flow categorized as good flow	95		0.22	
0-2A	23	68.7 (43.2)		
2 B-3	72	57.1 (16.3)		
Clinically significant event	94		0.68	
Yes	2	52.4 (5.2)		
No	92	60.1 (26.1)		
Procedural complications	95		0.14	
Yes	6	54.0 (7.1)		
No	89	60.3 (26.5)		
Hemorrhage	95		0.90	
Yes	19	59.3 (24.8)		
No	76	60.1 (26.1)		
Hyperdense MCA	95		0.997	
Yes	92	59.9 (26.1)		
No	3	60.0 (10.2)		

Association of various patient parameters including procedural and postprocedural events and thrombus density (Hounsfield units).



A & B. Average Hounsfield Units or clot length do not predict recanalization times. C & D. Average Hounsfield Units or clot length do not predict 90 day mRS. E & F. Average Hounsfield Units or clot length do not predict recanalization. G & H. Time from onset to procedure does not predict average Hounsfield Units or cloth length

Conclusions

We have not found any significant associations between either thrombus length or density and likelihood of recanalization, time to achieve recanalization, intraprocedural complications, postprocedural hemorrhage or functional outcome at ninety days. These results do not support a predictive value for thrombus quantification in the evaluation of AIS.