22-VIRC-464-AHA-VD

Heavy Alcohol Use Worsens Peripheral Artery Disease-Associated Myopathy

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Background: Heavy alcohol use can induce skeletal muscle dysfunction referred to as alcoholic myopathy. Likewise, peripheral artery disease (PAD) is characterized by an acquired skeletal muscle metabolic myopathy in ischemic muscles of the lower extremity. Although epidemiological studies have shown that heavy alcohol consumption is associated with a greater risk of PAD, data are lacking on the contribution of alcohol-related myopathy on PAD-associated skeletal muscle pathology.

Methods: We compared myofiber morphometrics, mitochondrial respiration, and oxidative stress measures in gastrocnemius biopsies from PAD patients with heavy alcohol use (>7 or >14 drinks per week, for females and males, respectively) (n = 13) with PAD patients (n = 13) and non-PAD controls (n = 17) consuming moderate to low or no alcohol consumption.

Results: Myofiber area and diameter were lower in heavy-drinking PAD patients compared with low or moderate drinkers ($P = .03$ and $P = .04$, respectively) and non-PAD controls ($P = .02$ and $P < .001$, respectively). Myofiber roundness was significantly higher in heavy drinking PAD patients compared with low to moderate drinkers ($P = .04$) and non-PAD controls ($P < .001$). Although there were no significant differences between PAD groups in mitochondrial respiration, PAD patients with heavy alcohol consumption tended to have lower respiration for complex I ($P = .14$), complex II ($P = .10$), and complex IV ($P = .16$) compared with PAD patients without heavy alcohol use. Both PAD groups had significantly reduced respiration of all Complexes compared with non-PAD controls ($P < .05$).

Conclusions: These data suggest that alcohol abuse may accentuate skeletal muscle pathology in PAD patients.

Author Disclosures: P. Koutakis: Nothing to disclose; **A. Ismaeel:** Nothing to disclose; **E. Fletcher:** Nothing to disclose; **E. Papoutsi:** Nothing to disclose; **R. Smith:** Nothing to disclose; **W. Bohannon:** Nothing to disclose; **D. Miserlis:** Nothing to disclose

22-VIRC-473-AHA-VD

Prediction of Adverse Events following Stent Graft Repair of Type B Aortic Dissection from Imaging Modalities

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Background: The prophylactic treatment of uncomplicated type B aortic dissection (TBAD) with thoracic endovascular aortic repair (TEVAR) is controversial. This warrants the identification of a high-risk category of dissections that may particularly benefit from surgical intervention. The analysis of radiographic features presents a promising modality of assessing this high-risk cohort. We test the ability of aortic size and shape metrics from the literature to predict patient suitability for TEVAR from preoperative imaging.

Methods: We collected a single institutional retrospective cohort of 36 patients with TBAD who received TEVAR and had preoperative and follow-up computed tomography angiography imaging. We tested eight aortic size and shape metrics. We segmented each patient's aorta and true lumen from the preoperative scan. Tortuosity, mean diameter, centerline curvature, and eccentricity were measured from the centerline. True and false lumen volumes and max diameter were calculated. The question mark angle, as previously defined by Li et al, was also measured. Univariate and multivariate logistic regression analyses were performed.

Results: In the univariate analysis, preoperative false lumen volume (odds ratio [OR], 26.2; 95% confidence interval [CI], 2.72-252; $P = .005$), mean diameter (OR, 9.6; 95% CI, 2.19-42.3; $P = .003$), and maximum diameter (OR, 9.0; 95% CI, 2.12-38.3; $P = .003$) were all significantly associated with post-TEVAR outcomes (Table). Tortuosity index (OR, 2.7, ; 95% CI, 1.14-6.37; $P = .024$) was the only significant shape parameter. In multivariate analysis, we found that preoperative maximum diameter (OR, 10.0, ; 95% CI, 1.50-67.0; $P < .018$) is a significant predictor of TEVAR outcomes independent of shape parameters, all of which were not significant.

Conclusions: False lumen volume and maximum diameter can predict the occurrence of reintervention and type I endoleak following TEVAR for uncomplicated TBAD. While size measures are effective in explaining aortic dissection behavior, current shape measures are not as effective and better methodologies must be developed.

Table.

	Univariate analysis		Multivariate analysis	
	OR (95% CI)	*P* value	OR (95% CI)	*P* value
Shape parameters				
Tortuosity	2.7 (1.14-6.37)	.021*	2.28 (0.36-14.3)	.379
Centerline curvature	1.5 (0.75-2.98)	.258	0.653 (0.14-2.96)	.580
Question mark angle	0.9 (0.45-1.72)	.718	0.688 (0.26-1.80)	.444
Eccentricity	1.5 (0.71-2.98)	.300	0.652 (0.21-2.01)	.457
Size parameters				
True lumen volume	3.4 (0.85-13.4)	.083		
False lumen volume	26.2 (2.72-252)	.005†		
Max diameter	9.0 (2.12-38.3)	.003†	10.0 (1.50-67.0)	.018*
Mean diameter	9.6 (2.19-42.3)	.003†		

CI, Confidence interval; *OR*, odds ratio.

Author Disclosures: K. Khabaz: Nothing to disclose; **S. Dhara:** Nothing to disclose; **J. Kim:** Nothing to disclose; **S. Sankary:** Nothing to disclose; **R. Milner:** Honoraria, Medtronic, W. L. Gore & Associates, Endospan; **L. Pocivavsek:** Nothing to disclose

22-VIRC-546-AHA-VD

Monocyte-mimicking Nanoparticles for Atherosclerosis-targeted Therapy

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Background: Atherosclerosis, characterized by plaque buildup in arteries, is a major cause of cardiovascular mortality globally. Despite advances in diagnostics and interventions over the past few decades, the treatment options and outcomes remain far less than optimal. Nanotechnology has demonstrated emerging success in clinical settings; however, a potent targeted nanotherapeutic for atherosclerosis remains underdeveloped.

Methods: In this study, we designed a new class of nanocarriers mimicking circulating monocyte features to enhance the site-specific delivery of theranostic agents for atherosclerosis. We first synthesized polymeric cores encapsulating a fluorescent payload with a modified nanoprecipitation method and cloaked the polymeric cores (NPs) with the plasma membrane fraction isolated from mouse monocytes.

Results: Our characterization results verified that NP cores are covered with a uniform lipid layer and that the resulting monocyte-mimicking nanoparticles (MNPs) retain the membrane proteins on their surface and have a similar value of zeta potential as monocytes. Both MNPs and NPs did not exhibit any hemotoxicity in vitro; however, when incubated with cultured human vascular endothelial cells (ECs), MNPs showed a significantly higher uptake efficiency by ECs than NPs. Moreover, our in vivo studies with ApoE-knockout mice indicates that MNPs accumulated only in the atherosclerotic arteries, but no other areas of the vasculature when administered intravenously.

Conclusions: Our findings strongly support that monocyte membrane cloaking facilitates the nanoparticle attachment to atherosclerotic regions and enhances the entry of nanoparticles into the inflammatory