

Utječe li arterijska hipertenzija na regionalni 2D „strain“ u bolesnika s akutnim koronarnim sindromom bez ST elevacije?

Influence of arterial hypertension on regional 2D strain analysis in patients with non-ST elevation acute coronary syndrome

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Uvod: U prethodnom istraživanju¹ smo pokazali superiornost 2D analize longitudinalnog sistoličkog „straina“ (LPSS, engl. *longitudinal peak systolic strain*) u usporedbi s vizualnom procjenom regionalnih ispada kontraktiliteta (RWMA, engl. *regional wall motion abnormalities*), a u dijagnostičiranju ispada kontraktiliteta uzrokovanih ishemijskom u akutnom koronarnom sindromu bez ST elevacije (NSTE-ACS, engl. *non-ST elevation acute coronary syndrome*).^{2,3} Niz istraživanja je utvrdio kako je u bolesnika s arterijskom hipertenzijom (AH) prisutno smanjenje LPSS u bazalnim segmentima miokarda lijeve klijetke. Cilj ovog istraživanja je ustanoviti postoji li utjecaj AH na točnost analize regionalnog LPSS u predviđanju zahvaćenosti pojedine koronarne arterije u NSTE-ACS.

Metode: Proveli smo retrospektivno istraživanje u bolesnika hospitaliziranih u Kliničkom bolničkom centru Zagreb od siječnja 2013. do prosinca 2015. zbog NSTE-ACS. Bolesnici kojima nije učinjena koronarografija, UZV srca, i oni s anamnezom koronarne bolesti srca su isključeni iz analize. Uključena su ukupno 123 bolesnika (62 ± 12 godina, 68% muškarci). Četiri kliničara koja nisu bila upoznata s nalazom koronarografije provela su analizu regionalnog LPSS koristeći 18-segmentni model, dok je kliničar koji je inicijalno snimio ultrazvuk srca ujedno i procijenio RWMA prema "Wall Motion Score Index" smjernicama.

Rezultati: U prethodnom istraživanju smo ustanovili povezanost između značajne stenozе koronarne arterije (suzenje >70% na koronarografiji), lošijeg RWMA i smanjenja regionalnog LPSS u bazalnim segmentima za sve 3 koronarne arterije (tablica 1). Bolesnici s AH (73%) su imali niži regionalni LPSS i lošiju RWMA u svim bazalnim segmentima, koji se pak značajno razlikovao samo u lateralnom i posteriornom (slika 1). Međutim, regresijska analiza i analiza kovarijance za arterijsku hipertenziju je pokazala da su regionalne promjene u bazalnim segmentima gotovo isključivo rezultat koronarne bolesti srca (tablica 2). Stoga, nismo utvrdili postojanje utjecaja AH na pouzdanost LPSS i RWMA u predviđanju značajne koronarne stenozе u NSTE-ACS (prosječna osjetljivost metode: 59% vs 38%).

Zaključak: Promjene regionalne kontraktilnosti miokarda u bolesnika s NSTE-ACS (zabilježene bilo s LPSS ili RWMA) se trebaju pripisati ishemijskoj u sklopu koronarne bolesti srca, neovisno o prisutnosti AH.

Background: In our previous research¹ we have shown 2D analysis of regional longitudinal peak systolic strain (LPSS) to be superior to visual assessment of regional wall motion abnormalities (RWMA) in detection of ischemia-induced loss of myocardial contractility due to non-ST elevation acute coronary syndrome (NSTE-ACS).^{2,3} The reduction of LPSS in basal segments in patients with arterial hypertension (AH) is well documented. The aim of this study was to assess the impact AH has on the accuracy of regional analysis in predicting the localization of significant stenosis in NSTE-ACS.

Methods: We performed a retrospective analysis of patients admitted to University Hospital Centre Zagreb from January 2013 till December 2015 due to NSTE-ACS. Exclusion criteria were no coronary angiography, absence of ECHO, and prior coronary artery disease. Total of 123 patients (62±12 years, 68% male) were included. 4 blinded clinicians performed regional LPSS analysis using 18-segment model, while RWMA, interpreted by clinician performing the echo, were categorized according to the wall motion score guidelines.

Results: Significant correlation between flow limiting stenosis (>70% narrowing on angiography), worse RWMA and a decrease of regional LPSS in basal segments was found for all 3 coronary vessels (Table 1). Patients with AH (73%) showed a lower regional LPSS and worse RWMA in all basal segments, with only lateral and posterior ones varying significantly (Figure 1). However, regression analysis accounting for AH as a covariant, showed the regional changes in basal segments to be a sole result of coronary disease (Table 2). AH was found to have no impact on reliability of LPSS and RWMA in predicting the localization of significant stenosis in NSTE-ACS (average method sensitivities: 59% vs 38%).

Conclusion: Changes in regional myocardial contractility, detected by either LPSS or RWMA, in patients with NSTE-ACS should be attributed to coronary disease irrespectively of the presence of AH.

TABLE 1. Regional 2D regional longitudinal peak systolic strain and visual regional wall motion abnormalities assessment according to segments and location of coronary stenosis.

Segment	Lesion location	LPSS (normal vs pathologic)	LPSS Sig.	RWMA to CAS Correlation Coefficient	RWMA Correlation Sig.
Basal anterior	LAD	-14.1±4.1% vs -12.3±5.4%	0.044*	0.232	0.032*
Basal lateral	LCx	-14.7±4.9% vs -10.9±6.5%	0.001*	0.262	0.015*
Basal posterior	LCx	-16.2±5.3% vs -12.0±5.7%	<0.001*	0.354	0.001*
Basal inferior	RCA	-16.3±4.8% vs -11.9±6.3%	<0.001*	0.163	0.133
Basal inferoseptum	RCA	-11.5±5.2% vs -10.1±3.8%	0.139	0.186	0.087
Basal anteroseptum	LAD	-14.4±5.8% vs -12.6±4.9%	0.076	0.179	0.098

RWMA – visual assessment of regional wall motion abnormalities; LPSS – longitudinal peak systolic strain; CAS – coronary artery stenosis; LAD – left anterior descending coronary artery; LCx – left circumflex coronary artery; RCA – right coronary artery; * P<0.05

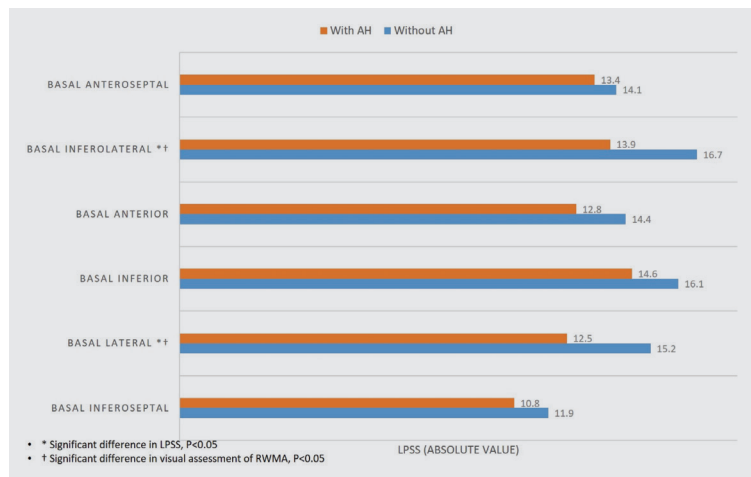


FIGURE 1. Differences in 2D regional longitudinal peak systolic strain in patients with and without arterial hypertension.

AH - arterial hypertension; RWMA – visual assessment of regional wall motion abnormalities; LPSS – longitudinal peak systolic strain.

TABLE 2. Multivariable regression analysis models showing interrelation between ratio of longitudinal peak systolic strain and visual regional wall motion abnormalities, and coronary artery stenosis with arterial hypertension as covariate.

Segment	Lesion location	Model 1 (LPSS): Sig. (AH) / Sig. (CAS)	Model 2 (RWMA): Sig. (AH) / Sig. (CAS)
Basal anterior	LAD	0.115 / 0.047*	0.126 / 0.079
Basal lateral	LCx	0.141 / 0.002*	0.196 / 0.048*
Basal posterior	LCx	0.114 / <0.001*	0.143 / 0.011*
Basal inferior	RCA	0.309 / <0.001*	0.232 / 0.117
Basal inferoseptum	RCA	0.309 / 0.170	0.457 / 0.046*
Basal anteroseptum	LAD	0.584 / 0.081	0.304 / 0.099

RWMA – visual assessment of regional wall motion abnormalities; LPSS – longitudinal peak systolic strain; AH – arterial hypertension; CAS – coronary artery stenosis; LAD – left anterior descending coronary artery; LCx – left circumflex coronary artery; RCA – right coronary artery; * P<0.05

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