Javlja li se mehanička disperzija s inducibilnom ishemijom tijekom dobutaminske stres ehokardiografije? 2D speckle tracking studija

Does mechanical dispersion occur with inducible ischemia on dobutamine stress echocardiography? A 2D-speckle tracking study

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CILJ: Mehanička disperzija (MD) je pokazatelj veće podložnosti fatalnim aritmijama nakon infarkta miokarda te ukazuje na prisutnost postsistolčkog skraćivanja (PSS) koje je dokazano u bolesnika s inducibilnom ishemijom na dobutaminskoj stres ehokardiografiji (DSE). PSS se navodi i u bolesnika koji su razvili intrakavitarni gradijent (IKG) tijekom DSE. Stoga smo odlučili istražiti mogući porast MD u bolesnika podvrgnutih DSE s visokim dozama dobutamina (dbt).

PACIJENTI I METODE: DSE je učinjena u 30 bolesnika (17 muškaraca, prosječne dobi 58±12 godina). Protokol je uključivao apikalne 2-, 3- i 4-komorne prikaze tijekom postupnog porasta doze dbt do pune doze (40 mcg/kg/min) ili postizanja ciljane frekvencije. Prema rezultatu pretrage, bolesnici su podijeljeni u 3 skupine: bolesnici s negativnom DSE koji su razvili IKG (Grad+, n=10), bolesnici s negativnom DSE, koji nisu razvili IKG (DSE-, n=10) i bolesnici s pozitivnom DSE (DSE+, n=10). Nijedan od bolesnika iz DSE+ nije razvio IKG. 2D-speckle tracking snimanja su rađena na početku pretrage i pri vršnim dozama dbt, čime je dobiven 17-segmentni model LK. Mjereno je vrijeme od vrha R vala na EKG-u do vrha krivulje strain-a, a MD je izračunata kao SD vremena do vršnog strain-a između 17 segmenata. Izračunat je omjer MD pri vršnim dozama dbt i MD na početku (MDp/MDb), čime je izražen porast u MD.

REZULTATI: Sve 3 skupine su pokazale porast MD pri vršnim dozama, a najveći porast je imala DSE+ skupina: MDp 38,0 vs. MDv 81,6, p<0.002 (MDp/MDb=2,25±1,22). Skupine s negativnom DSE su pokazale slične rezultate – Grad+: MDp 38,9 vs. MDv 55,5, p<0.001 (MDv/MDp=1,47±0,41); DSE-: MDp 46,7 vs. MDv 63,9, p<0.01 (MDv/MDp=1,45±0,51). Vrijednost omjera MDv/MDp DSE+ skupine je bio značajno veći u usporedbi s Grad+skupinom (p=0.04) te DSE- skupinom (p=0.05).

ZAKLJUČAK: U bolesnika s pozitivnom DSE nađen je veći porast MD u usporedbi s bolesnicima s negativnim nalazom bez obzira na razvoj IKG, što sugerira da je učestalost javljanja PSS manja u bolesnika s IKG. Studija potvrđuje ulogu MD u otkrivanju ugroženih bolesnika te može biti koristan dodatak interpretaciji DSE nalaza.

AIM: Mechanical dispersion (MD) was recently established as an indicator of greater susceptibility to fatal arrhythmias in patients (pts) after myocardial infarction and suggests the presence of post-systolic shortening (PSS), which was demonstrated in pts with inducible ischemia (II) on dobutamine stress echocardiography (DSE). Furthermore, PSS has also been suggested in patients developing an LV intracavity gradient (ICG) during DSE. Thus, we sought for a potential increase in MD in pts undergoing full dose DSE for II.

PATIENTS AND METHODS: DSE was acquired in 30 patients (pts) (17 male, mean age 58±12 years). Procedure included ultrasound acquisition of apical 2, 3 and 4 chamber views during an increase of dobutamine (dbt) up to a full dose of 40 mcg/kg/min or reaching target HR. According to the result, we divided the pts to 3 groups: DSE negative pts, who developed an ICG (Grad+, 10 pts), DSE negative, gradient negative pts (DSE-, 10 pts) and DSE positive, ICG negative pts (DSE+, 10 pts). None of the DSE positive pts developed ICG. Images acquired during baseline and peak dbt dose were analyzed using 2D-speckle tracking, obtaining a 17-segment LV model. Time from peak R wave on ECG to peak strain was measured and MD was calculated as the SD of the time to peak strain between the 17 segments. To compare the groups, we calculated the ratio of MD at peak dose to MD at baseline (MDp/MDb) in each pt, expressing the increase in MD.

RESULTS: All 3 groups showed an increase in MD at peak dose, with the greatest increase occurring in the DSE+ group: MDp 38.04 vs. MDp 81.64, p<0.002 (MDp/MDb=2.25±1.22). Both DSE negative groups showed similar results: Grad+: MDp 38.94 vs. MDp 55.51, p<0.001 (MDp/MDb=1.47±0.41); DSE-: MDp 46.69 vs. MDp 63.86, p<0.01 (MDp/MDb=1.45±0.51). MDp/MDb of the DSE+ group was significantly greater compared to the Grad+ group (P=0.04), as well as to the DSE- group (P=0.05).

CONCLUSION: Pts with a positive DSE demonstrated a greater increase in MD compared to the pts who did not develop II, regardless of the development of an ICG. This suggests that the potential occurrence of PSS with an inducible ICG is less extensive than with II. Data confirm the role of MD in detecting pts at risk, suggesting it may be used as an adjunct in the interpretation of DSE data.

LITERATURE

- Haugaa KH, Grenne BL, Eek CH, et al. Strain echocardiography improves risk prediction of ventricular arrhythmias after myocardial infarction. JACC Cardiovasc Imaging. 2013;6(8):841-50.
- Haugaa KH, Smedsrud MK, Steen T, et al. Mechanical dispersion assessed by myocardial strain in patients after myocardial infarction for risk prediction of ventricular arrhythmia. JACC Cardiovasc Imaging. 2010;3(3):247-56.

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