

Title:

Remarkable elevations of Troponin-I and ST segments in electrocardiogram in adolescents with Variant Angina.

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Background:

Variant angina (VA) occurring in adults is considered a transient status of coronary arterial spasm and can be life-threatening. VA in adolescents has rarely been reported. Recently, we have noticed an unusual increase of VA in emergent room (ER).

Objective:

We undertake a case-control study to explore the characteristic features of adolescent VA.

Material and Method:

From Jan. 1, 2008 to Jun. 30, 2014, we retrospectively analyzed 15 cases of adolescent VA admitted to China Med. Univ. Hosp. Diagnosis of VA is defined as 1) Acute chest pain 2) elevations of serum Troponin-I and elevated ST segments in EKG, 3) normal cardiac function on EKG and 4) no significant pericardial effusion. Using ICD-9 code number 786.50 to search for chest pain patients that visited our ER during the same period, and excluded those with chronic illness, chest surgery or major organ impairment, we identified 29 adolescents as controls.

Result:

VA patients showed male preponderance (13/15 vs. 9/29,  $p = 0.0015$ ), older in age ( $14.7 \pm 2.6$  years vs.  $10.8 \pm 4.7$ ,  $p = 0.014$ ), and higher in body mass index (BMI,  $23.9 \pm 4.6$  vs.  $19.3 \pm 4.3$ ,  $p = 0.013$ ) than that of controls. All VA patients identified their chest pains at the precordial area, while only 7 controls did ( $p < 0.0015$ ). There was no significant difference between the groups in allergy history or current medications. Troponin-I was remarkably elevated in all VA patients ( $3.9 \pm 2.3$  ng/ml), reaching its peak at around 36 hours after admission ( $6.0 \pm 3.0$ ), and returned to normal at 3<sup>rd</sup> to 5<sup>th</sup> day of hospitalization. This pattern of rise-&-fall was in consistent with that of

CK-MB levels ( $29.0 \pm 18.8$  ng/ml) and ST segment elevations in ECG ( $2.9 \pm 1.1$  mm). The controls showed normal levels in all of these parameters. Of the image studies in VA patients, the echocardiograms showed normal LV contractility ( $EF = 66.3 \pm 5.4\%$ ). Th-201 myocardial scan with dipyridamole challenge revealed reversible defects in all 12 tested patients, and persistent defects in 6 patients. Selective coronary angiogram did not find significant stenosis in any main coronary arteries.

## Conclusion

Male preponderance, older age, higher BMI, precordial chest pains, and a typical pattern of rise-&-fall in ST segments of ECG and high levels of Troponin are characteristic features of adolescent VA patients.