

Myocardial perfusion SPECT findings and serum chromogranin A levels in patients with old myocardial infarction



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Introduction



- Chromogranin A (CgA) is a soluble polypeptide stored within and released from secretory granules of endocrine, neuronal, and other cell types (including cardiomyocytes), together with catecholamines, neuropeptides, and other hormones.
- CgA appears to be a marker of overall neuroendocrine activity.
- Increased levels of serum CgA have been found not only in patients with neuroendocrine neoplasms but also with other malignancies, hypertension, myocardial infarction, heart or renal failure.

Methods



- A population of 307 patients (202 males, 105 females) was enrolled.
- The study group consisted of 118 individuals (38.4%) with myocardial infarction more than one-year-old (MI group); the remaining 189 (61.6%) had no known heart disease (control group).
- All patients were submitted to myocardial perfusion scintigraphy (MPS) with Tc-99m-Tetrofosmin (one-day protocol) after blood sampling for serum CgA measurement.
- CgA was measured by radioimmunoassay (RIA).

Results



Patient characteristics

| | Control group (n=189) | MI group (n=118) | <i>p</i> |
|---------------------------------|--------------------------|---------------------|----------|
| <i>Gender (Male/Female)</i> | 97/92 | 105/13 | <0.001 |
| <i>Age (years)</i> | 65.2±9.8 | 66.0±9.8 | 0.45 |
| <i>Smoker</i> | 39 (20.6%) | 30 (25.4%) | 0.33 |
| <i>Hypertension</i> | 136 (71.9%) | 106 (89.8%) | <0.001 |
| <i>Hypercholesterolemia</i> | 108 (57.1%) | 105 (89.0%) | <0.001 |
| <i>Diabetes</i> | 43 (22.7%) | 37 (31.3%) | 0.09 |
| <i>LVEF (%)</i> | 66.2±5.6 | 53.7±10.3 | <0.001 |
| <i>Beta blockers</i> | 66 (34.9%) | 99 (83.9%) | <0.001 |
| <i>Calcium channel blockers</i> | 22 (11.6%) | 30 (15.9%) | 0.002 |
| <i>ACEi</i> | 126 (64.6%) | 99 (83.9%) | 0.001 |

Results



Myocardial perfusion scintigraphy (MPS): semi-quantitative analysis

| <u>MPS findings</u> | Control group (n=189) | | MI group (n=118) | |
|--|--------------------------|-------|---------------------|-------|
| | n | % | n | % |
| <i>Normal or borderline (SDS < 3)</i> | 147 | 77.8% | 37 | 31.4% |
| <i>Mildly abnormal (SDS = 3-4)</i> | 27 | 14.3% | 41 | 34.7% |
| <i>Moderately abnormal (SDS = 5-6)</i> | 9 | 4.7% | 17 | 14.4% |
| <i>Significantly abnormal (SDS > 6)</i> | 6 | 3.2% | 23 | 19.5% |

Results

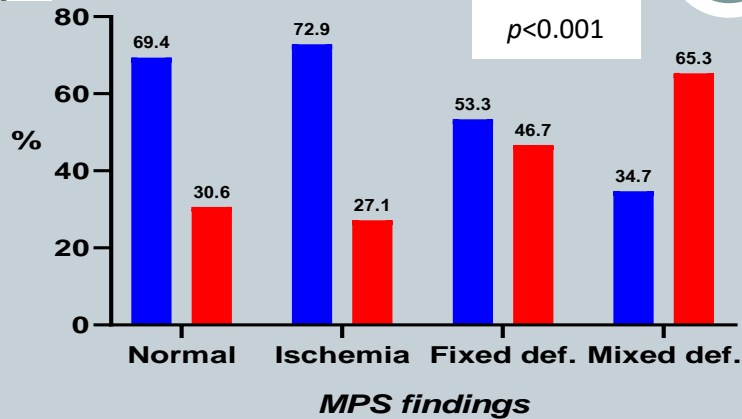


- Serum CgA was significantly higher in the MI group than in the controls ($p < 0.001$), whereas patients with elevated serum CgA were to a significant degree older than those with normal levels ($p < 0.001$).
- The majority of patients in the control group (152, or 80.4%) had normal MPS or only minor/equivocal findings. The opposite was observed in the MI group, where abnormal MPS findings (ischemia and/or fixed deficits) were found in 97 patients (82.2%).
- Serum CgA was increased in significantly more patients with an abnormal MPS than in those with normal or borderline MPS findings (43.3 vs. 30.6%, $p = 0.022$).
- Increased serum CgA correlated significantly with MPS abnormalities (either ischemia and/or fixed deficits) ($p < 0.001$).

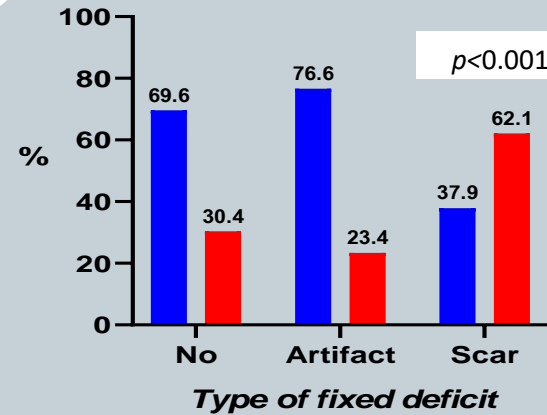
Results

Proportion of serum CgA abnormality in relation to the type of MPS findings.

a

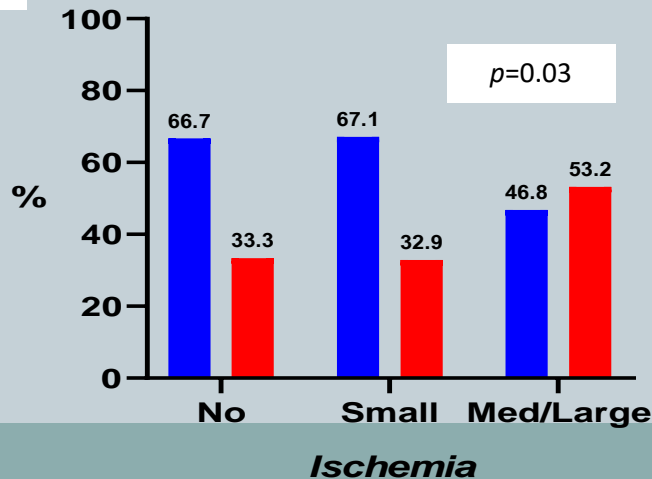


b

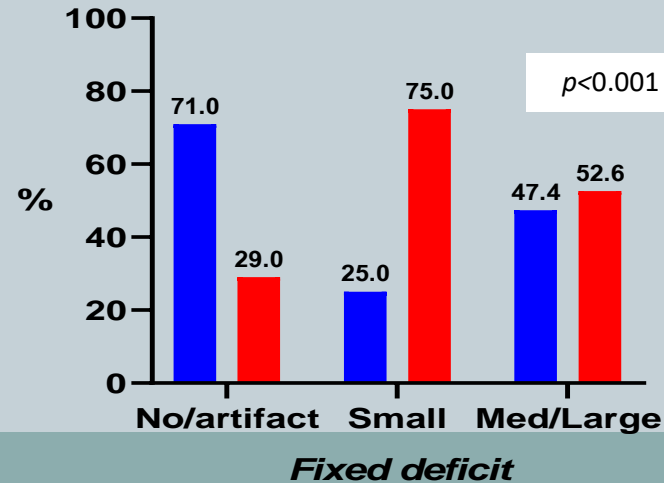


■ CgA normal
■ CgA abnormal

c



d



Discussion



- The role of serum CgA as a biomarker in the acute and subacute phases of MI is previously proven. Our study demonstrated that CgA is elevated also in patients with an old MI, suggesting that sympathetic activation is prolonged beyond one year after the infarction.
- Study limitations:
 - - Lack of gated-SPECT to distinguish attenuation artifacts
 - - Patients with hypertension or HF may exhibit increased serum CgA
 - - Although small, the likelihood of increased CgA due to an undiagnosed malignancy cannot be ruled out

Conclusion



- More studies are needed to elucidate the clinical usefulness of CgA as a potential marker of the veracity of MPS findings, particularly in those cases with low pretest probability for CAD and when false positives and artifacts are deemed as likely.

References

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