Impact of isolated non-dominant hypoplastic right coronary artery disease on cardiovascular events and mortality rates in the elderly

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It is generally believed that serious events are unlikely to result from atherosclerotic disease of a non-dominant hypoplastic right coronary artery (RCA). Left dominant coronary artery system are usually associated with higher in-hospital mortality among patients undergoing percutaneous coronary intervention.\textsuperscript{[1,2]} Nevertheless, clinical series or reports of right ventricle infarction, malignant arrhythmias and sudden death correlated to non-dominant RCA have been reported in the literature in the past years.\textsuperscript{[3,4]} The specific contribute of non-dominant RCA disease on long-term follow-up in patients aged over 65 years has not been yet clarified.

We retrospectively analysed the clinical and instrumental records of 12,461 consecutive patients underwent coronary angiography between January 2007 and January 2017: patients with isolate non-dominant hypoplastic RCA disease > 50% luminal narrowing on quantitative coronary angiography were enrolled and divided on the basis on eventual percutaneous treatment of the target vessel in treated with angioplasty and stenting (stented) and not treated with angioplasty and stenting (non-stented). Patients with significant atherosclerotic lesion of the left system were excluded. Information about in-hospital outcomes was obtained from an electronic clinical database for patients maintained at our institution and by review of hospital records for those discharged to referring hospitals. Post-discharge survival status was obtained from the Municipal Civil Registries. Information on occurrence of RCA related-ST-segment elevation myocardial infarction (STEMI) and RCA related-non-ST-segment elevation myocardial infarction (NSTEMI), as well as ventricular arrhythmias occurrence or repeated interventions at follow-up were collected by consulting our institutional electronic database and by contacting referring physicians and institutions and all living patients.

Institutional Review Board of Rovigo General Hospital, Rovigo, Italy gave the consent for this retrospective study. Isolated disease of non-dominant hypoplastic RCA were detected in 153 patients [1.2% (153/12,461 patients), mean age: 56.1 ± 10.3 years, 83 males] and a stenting of the vessel was performed in 57 patients (37.2%).

Patients with treated RCA more frequently had a history of diabetes mellitus and ventricular arrhythmias than those non-treated, whereas angiographic characteristics were significantly worse in the stented group (Table 1). Over the mean follow-up period of 47.2 ± 1.2 months, the episodes of ventricular arrhythmias were similar in the stented group versus the non-stented group [5.2% (3/57 patients) vs. 1% (1/96 patients), \( P = 0.11 \)]. RCA related-NSTEMI was significantly higher in the non-stented group [1.7% (1/57 patients) vs. 4.1% (4/96 patients), \( P < 0.01 \)] whereas the rate of STEMI was similar [3.5% (2/57 patients) vs. 2.0% (2/96 patients), \( P = 0.52 \)]. No significant differences were observed in the two-year cardiovascular mortality [8.7% (5/57 patients) vs. 3.1% (3/96 patients), \( P = 0.13 \)] (Figure 1).

Our retrospective study clarified for the first time...
in literature the impact of isolated non-dominant hypoplastic RCA disease on cardiovascular events and mortality in patients aged over 65 years suggesting that stenting of significant disease did not impact significantly on long-term mortality but only on occurrence of NSTEMI.

Although our data are not powered to detect clinical or angiographic factors predisposing to cardiovascular events or mortality, decision about treatment of the non-dominant RCA should probably be based on presentation, the size of the vessel (> 2.5 mm might be a discriminant) and lesion characteristics.

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Table 1  Demographics, clinical and echocardiographic and angiographic characteristics of the study and control population.

| Characteristics                          | Stented (n = 57) | Non-stented (n = 96) | P-value |
|------------------------------------------|-----------------|---------------------|---------|
| Age, yrs                                 | 74.8 ± 14.2     | 77.2 ± 11.6         | 0.26    |
| Sex, male                                | 29 (50.8%)      | 53 (55.2%)          | 0.59    |
| Arterial hypertension                    | 19 (33.3%)      | 28 (29.1%)          | 0.58    |
| Diabetes mellitus                        | 23 (40.3%)      | 21 (21.8%)          | 0.01    |
| Hypertension                             | 21 (36.8%)      | 27 (28.1%)          | 0.24    |
| Dyslipidaemia                            | 20 (35.1%)      | 29 (30.2%)          | 0.60    |
| Chronic obstructive pulmonary disease    | 15 (26.3%)      | 20 (21.0%)          | 0.48    |
| Chronic kidney disease                   | 17 (29.8%)      | 20 (21.0%)          | 0.58    |
| Smoking                                  | 14 (24.6%)      | 16 (16.5%)          | 0.32    |
| Heart failure                            | 14 (24.6%)      | 14 (14.4%)          | 0.32    |
| Atrial fibrillation                      | 14 (24.6%)      | 14 (14.4%)          | 0.32    |
| Ventricular arrhythmias                  | 14 (24.6%)      | 14 (14.4%)          | 0.32    |
| Lesion type                              |                 |                     |         |
| A                                        | 18 (31.6%)      | 47 (49.0%)          | 0.03    |
| B                                        | 20 (35.1%)      | 39 (40.6%)          | 0.48    |
| C                                        | 19 (33.3%)      | 10 (10.4%)          | 0.01    |
| Right coronary artery QCA diameter, mm   | 2.61 ± 8.2      | 2.08 ± 10.8         | 0.02    |
| Lesion QCA length, mm                    | 18.4 ± 6.3      | 12.1 ± 8.2          | 0.03    |
| Stent type                               |                 |                     |         |
| Drug-eluting stents                      | 39 (68.4%)      | –                   | –       |
| Bare-metal stents                        | 18 (31.5%)      | –                   | –       |

Data are presented as means ± SD or n (%). Student’s t-test and Mann-Whitney U test were used for continues variables. Categorical variables were compared by the Pearson’s chi-squared test. *Refers to the estimated glomerular filtration rate less than 60 mL/min per 1.73 m. QCA: quantitative coronary angiography.
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